

VI. *Notes on the Butterflies observed in a tour through India and Ceylon, 1903-4.* By G. B. LONGSTAFF, M.D., Oxon.

[Read December 7th, 1904.]

INTRODUCTORY.

WHAT follows is an account of the entomological experiences of a "globe-trotter," that is, of a traveller whose main object was to take an all too rapid glance at the scenery, the peoples, and the architecture of the places visited, and whose route was planned with that object. That I was able to give so much time to collecting was due to the fact that, whereas my daughter and her companion felt the heat so much that they usually kept within doors from about 10 a.m. to 3 p.m., I, for my part, protected by a "sola tope" of the "pigsticker" type, and a spinal pad to my coat, suffered no serious inconvenience from the sun's rays *so long as I took active exercise.*

I sailed from England in September 1903 without the slightest intention of collecting, and started accordingly with no entomological outfit save half-a-dozen pill-boxes. Not only was I without net and killing-bottle, I was without books, and worse still, was in woeful ignorance of the Rhopalocera of the Oriental Region.

The day after landing we took train for Simla, and a little south of Jhansi I was struck by the large numbers of bright yellow butterflies along the railway banks—in all probability *Terias hecabe*, L. October 5th found us at Kálka, at the foot of "The Hills." Fortunately the new railway was not yet open, so we had to be driven up the 58 miles to Simla in a "tonga," or post-cart, by a wild-looking hillman who handled the ponies magnificently. To one fresh from Europe the sights on the road were truly marvellous: long trains of wagons drawn by humped oxen or by buffaloes; natives in divers strange costumes, or lack of costume; flocks of goats and herds of cattle; strings of pack-mules, and, to crown all, long lines of solemn camels, always hideous, yet always picturesque. However, amid all these strange sights there was one other which

interested me if possible even more, I mean the multitude, the variety, and above all the beauty of the butterflies. The first sight of such a thing as the big *Hypolimnys bolina*, L., black flashing with violet-blue, excited an emotion better imagined than described. At all events, the creatures took me fairly by storm: collect I must!

The resources of the bazar at Simla only produced a child's butterfly-net, a mere toy, scarce twelve inches in diameter and of a pale yellow colour! Armed with this and a tin cigarette-box filled with triangular envelopes I took the field. To this scanty equipment was shortly added a cyanide bottle. It was two months before the toy-net was superseded by an umbrella-net from Watkins and Doncaster. This last is a very convenient weapon for use in towns, or when travelling or sight-seeing. It is inconspicuous when rolled up, but can be quickly brought into action; it is however inadequate for serious work. In Calcutta I purchased a large Y-net with jointed canes, and had it fitted to the end of a landing-net stick that was made in two pieces that were six feet long when joined. A fair-sized net is required for large and swift butterflies, while for the many that habitually fly high and settle far from the ground, six feet is none too long a stick, though in narrow woodland paths it will be found unwieldy. Another time I should travel with a jointed stick of three segments, each three feet long. I may here add that mosquito netting is far more serviceable than leno, owing to its superior power of resistance to thorns of all sorts.

Mr. Otto Möller, of Darjiling, told me that he found it best to pinch all butterflies, even the smallest, but I found that Blues and Skippers were best "bottled." No doubt it would have been better to pin many moths, but my things were all enveloped in the way usual for butterflies, and the dates, localities, and any remarks that suggested themselves were inscribed upon the papers. [These data are still attached to the specimens.] Since getting back to England the insects have been serially numbered, and the data copied into a note-book. On another journey I should number the insects at the time, and while putting the more important data on the papers as before, copy these, amplified where necessary, into a book. This would, I am quite sure, save much time and result in a more complete record.

The insects were sent to England from time to time

by parcel post in small cigar-boxes, each enclosing a ball of naphthalene. In no case do they appear to have sustained any injury on the way. They have been beautifully set at Oxford by Mr. A. H. Hamm, and all that are worth preserving will be placed in the Hope Collection, while the explanatory note-book will be deposited in the library of the Department.

The total number of specimens sent home was as follows :—

	<i>All countries.</i>	<i>India and Ceylon only.</i>
Butterflies . . .	1867 . . .	1494
Moths . . .	206 . . .	125
Coleoptera . . .	21 . . .	15
Hymenoptera . . .	27 . . .	27
Neuroptera . . .	15 . . .	5
Diptera . . .	5 . . .	5
Hemiptera . . .	10 . . .	8
Orthoptera . . .	13 . . .	13
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In round numbers, I was five months in India and three weeks in Ceylon—say, six months together; during this time I took nearly 1700 specimens, of which 1500 were butterflies belonging to 204 species.

To these may be added the results of a fortnight in China, a month in Japan, and a fortnight in Canada, viz. 500 more specimens, and 64 additional species of butterflies, which are only incidentally alluded to at the end of this paper.

Naturally in a rapid tour of this kind there is small probability of turning up anything new, but it is hoped that some of the observations made (even on the commonest species) may throw a glimmer of light on some of those questions of Bionomics which are now attracting attention.

Simla, lat. 31° N., alt. 7200 ft.

In reference to the seasonal variation of many species it may be remarked that at Bombay on October 2nd and 3rd there was heavy rain, the tail-end of the monsoon. It was held to be a very late season, the rain had lingered and the cold weather was delayed.

My collecting at Simla was confined to a riding expedition along the old Hindustan-Tibet road. This is an

excellent riding-path along the watershed of the Sutlej and Jumna, cut at one time on the hot and dusty southern side of the mighty ridge, where the terraced slopes are covered with crops of maize, or ruddy millet; anon crossing to the northern side which is mostly clothed with fine forest of spruce, deodar, holm-oak and rhododendron—thus winding in and out, but for the 50 miles that we traversed always maintaining an altitude of from 7000 to 9000 ft. We went by way of Fāgu, Theog, Matiana and Narkanda to Bāghi, returning by the same route, except that from Bāghi to Narkanda we walked over Mt. Huttú, 11,000 ft.* The expedition occupied eight days, but for simplicity of description I shall not distinguish between outward and return journeys.

The general aspect was decidedly autumnal; the nights were chilly and most flowers had gone to seed. There was more cloud than usual, and there were occasional slight thunder-showers. Most of the butterflies seen appeared to have been out some time, and were much battered. Two circumstances tended to restrict the bag—one, the fact that collecting was for the most part confined to a narrow mountain road, bounded by a precipice on the lower, and a cliff upon the higher side; the other, a limitation of wide application, that a tropical sun is not conducive to rapid pursuit.

Simla, alt. 7200 ft., to *Fāgu*, alt. 8200 ft.

October 10th and 17th.

Gonepteryx rhamni, L., var. *nipalensis*, Dbl., was abundant throughout the journey, and so was *Aulocera swaha*, Koll., though in very poor condition; both occurred in Simla itself. The last named is a Satyrid having on the upper-side a resemblance to our White Admiral, flying also with much of the grace of that favourite butterfly. It loves open spaces in woods, returning to the same spot when disturbed. When it settles on the ground, a rock, a flower, or a tree trunk, it often goes over on one side as much as 45° or even 50°. I saw one of these butterflies make three successive efforts, getting further over each time! On two distinct occasions I watched a butterfly settle twice, turning the first time over to the

* In Indian names “á” is pronounced as “a” in father, “ú” as “oo” in boot, “a” or “u” as “u” in but.

right, the second time to the left. I think there is no doubt that this "list" makes the insect less conspicuous.

Pararge schakra, Koll., is another common roadside butterfly in the Simla district; it closely resembles our *P. megara*, L., but is larger. *Chrysophanus phlæas*, L., var. *timens*, Cr., was also common; *Colias fieldii*, Mén., is sufficiently like our *C. edusa* to readily pass for that species; *Polyommatus baxterius*, L., is also suggestive of our South Downs, where it has been seen; the same may be said of *Argynnis lathonia*, L. Again, *Pyrameis indica*, Herbst., is very like our *P. atalanta*, L., though not so handsome and scarcely as graceful in its movements. So far there was plenty to bring to mind the fact that one was still within the Palæarctic Region. There were however a few insects to suggest the close proximity of the great Oriental Region, for if *Atella phalanta*, Dru., is very like a Fritillary (at least on the upper-side), and *Ilerda sena*, Koll., closely resembles a Hairstreak, on the other hand, the under-side of *Belenois mesentina*, Cr., is decidedly more brilliant than our Whites, while there is no denying that *Precis orithyia*, L., is quite Oriental in its aspect. This insect had struck me with admiration at Solon on the way up to Simla, and is called by the school-boys of India's summer capital, "The Ladies' Fancy." With the habits of a *Vanessa* or *Pyrameis*, there is something about the shape of the wings, the prominent ocelli, the brilliant blue of the hind-wings, and the leaf-like colouring of the under-side which gives it a very "tropical" appearance. However, one soon learned to look upon it as one of the most familiar butterflies of Northern India. At Fāgu it was common, but like most butterflies which have a proclivity for settling on the ground, not too easy to catch.

At Fāgu another butterfly of European aspect was common, *Vanessa kashmirensis*, Koll.; this is no credit to its name, but looks like an *urticæ*, L., that had been born and bred in the "Black country." But the Chalcosiine day-flying moth, *Agalope hyalina*, Koll., elegant in shape and quiet in colour, white, shaded with grey towards the tips, ochreous at the base, was quite a stranger.

Fāgu, 8200 ft., to Theog, 7400 ft.

October 11th and 16th.

Before our start in the morning I found abundance of *Chrysophanus pavana*, Koll., in dry weedy corners of

cultivated ground; this is sufficiently distinct from *C. phlæas*, but has no especial oriental glamour.

From the ground by the roadside I picked up a large newly-emerged *Bombyx* with the awe-striking name of *Trabala vishnu*, Lefevre; it was unfortunately a good deal damaged in the killing, through having no oxalic acid available. Two Blues, *Cyaniris vardhana*, Moore, and *Zizera maha*, Koll., var. *diluta*, Feld., together with the Hairstreak, *Ilerda sena*, completed the bag for this stage.

Theog, 7400 ft., to Matiana, 7700 ft.

October 11th and 16th.

At Theog, our first halting-place, *Gonepteryx rhamni*, var. *nipalensis*, was especially common, and here I took my first *Athyma opalina*, Koll., a Vanessid resembling on both upper and lower surfaces *Limenitis sibylla*, L., an insect to which it is closely allied in structure and habits.

On the road, besides *Ilerda sena*, *Chrysophanus pavana*, *Precis orithyia*, and *Argynnis lathonia*, var. *issawa*, Moore, several things turned up. Of *Pyrameis cardui*, L., a fresh brood appeared to have emerged on the 15th or 16th October, and was common at the flowers of a straw-coloured thistle. I saw a few more *Athyma opalina*, and secured one. In their elegant floating flight one seems to see through the white markings of the butterflies of this genus. The Simla school-boys call them "Sailors," but to me the name "Ghosts" would seem more appropriate. They settle on the leaves of trees or shrubs, rarely affecting flowers. Here I got my first *Precis lemonias*, L., an insect with the habits (and structure) of a Vanessid, but with much the appearance of *Pararge ægeria*, L. A specimen of *Terias libythea*, F., taken on the return journey, bears the note "easy to catch," which is true, but at the time I do not think that I distinguished it from the much commoner *T. hecabe*, which it closely resembles.

At Matiana I found *Chrysophanus phlæas*, var. *timeus*; *Vanessa kashmirensis*; *Precis orithyia*; and two specimens of *Huphina nerissa*, F., both males. This last is a somewhat glorified *P. napi*, L.; one of them appeared to have a slight scent which I could not describe, but certainly it was not that of the male *napi*.

Perhaps the most abundant butterfly at Matiana, and indeed throughout the woods of the district, was *Cyaniris*

singalensis, Moore, very like our *argiolus*; it was in poor condition, flying about the tops of tall shrubs, but not seeming to affect either ivy or holly, although both were there.

Pararge schakra was especially abundant at Matiana and on the road thence to Narkanda. It differs from our *P. megara*, L., in being larger and having more striking ocelli, though these are variable, one of my specimens, a female, having the ocellus near the tip of the fore-wing far larger than the rest. In its habits this insect sometimes reminds one of *P. megara*, sometimes of *Satyrus semele*, L. It abounds along roads and in bare places, alighting almost always on the earth or on rocks, with its wings expanded (as with *megara*), but when it settles down to rest the wings are raised, the fore-wings drawn back within the hind-wings, all that remains visible being the colour of dust. In no case did I see it turn on one side as *S. semele* does, but three times I observed it settle with its back to the sun, so as to reduce its shadow to a mere line; unfortunately I made this observation towards the end of my acquaintance with the butterfly, so was unable to make sure whether this was a mere chance or a definite habit. At any rate, I did not observe any instances to the contrary. I suspected in *P. schakra* the existence of a very slight sweet scent, that appeared to be unlike that of any other species.

At Matiana I beat out of alders a number of geometers, three *Philereme variegata*, Warr., and one *Cidaria nipponica*, Butl.; they had a jerky flight, which saved many of them from capture. A Deltoid, *Hypena tristalis*, Leder., came to light at night.

Matiana, 7700 ft., to Narkanda, 8800 ft.

October 12th and 15th.

Many of the same insects were met with as on the previous stage, but the following may be noted: *Terias hecabe*, my first specimen of the commonest species of a very characteristic Indian genus; *Ganoris canidia*, Sparrm., a White like *P. rapæ*, L., but with bigger black spots; and *Belenois mesentina*, flying fast and going straight ahead in a purposeful manner. Here I may remark that the swift flight of the Whites generally has much impressed me; it is evidently closely related to the fact that they are

quite the most conspicuous of all butterflies, especially at a distance. *Argynnis lathonia*, var. *issæa*, was again well to the front; another *Athyma opalina* was securely "papered," and a specimen of *Precis lemonias* was taken in which the anal angle of both hind-wings had been bitten off nearly symmetrically. Amongst many of the *argiolus*-like *Cyaniris singalensis*, Moore, one *C. vardhana*, Moore, was taken; also *Chrysophanus pavana*. Three geometers, *Philereme variegata*, Warr., *Docirava squilineata*, Walk., and the widely-distributed *Polyphasia truncata*, Hufn. (*immanata*, Haw.), complete the list.

At Narkanda *Argynnis lathonia*, var. *issæa*, was in great numbers in the woods, so was the Chalcosiine moth *Agalope hyalina*; this flies fast and always in the same direction, in this case up-hill and against the wind, more especially up certain gorges in the mountain side. It was hard to catch, and on the wing looked much larger than it is, but on settling vanished suddenly, burying itself in the herbage.

Colias fieldii was common, but was not remarkable for swift flight. *Terias hecabe* was also to be seen.

Narkanda, 8800 ft., to *Bághi*, 8900 ft.

October 13th.

The road through the magnificent forest, whence gaps in the towering spruces give inspiring glimpses of "The Snows" lying far away across the deep valley of the Sutlej, was at this season too dark and chilly to be the haunt of butterflies. At *Bághi* were *Atella phalanta*, *Neptis astola*, Moore, worn specimens of *Anlocera swaha*, and *Agalope hyalina*.

Bághi, 8900 ft., over *Mt. Huttú*, 11,000 ft., to *Narkanda*,
8800 ft.

October 14th.

Bághi, our furthest point, is but 26 miles W. N. W. of Simla, though by the winding mountain road it is fifty. The steep footpath up *Mt. Huttú*, when it has attained an elevation of a little more than 10,000 ft., emerges from the forest on to a flowery clearing that bore evidence of former cultivation. Here I saw *Colias fieldii*, *Atella phalanta*,

and *Argynnis lathonia*, and here I took two specimens of *Parnassius hardwickii*, Gray, one worn, the other in beautiful condition; it is a lovely creature, but the under-side has a curious resemblance to oiled paper. Delicate looking though it be, it is strangely tenacious of life. The concurrence of a "Clouded Yellow," a "Queen of Spain," and an "Apollo" was very suggestive of the Alps. All too soon the path plunged again into the now somewhat scrubby forest to come out finally, at near 11,000 ft., on to the grassy, flower-bedecked plateau in which the mountain culminates.

The Lha To, or rude altar of the degraded form of Buddhism that is prevalent in "The Hills," crowning the highest peak, reminded one of the High Places of Baal. The troops of butterflies seemed almost to rejoice in the glorious panorama of "The Snows" spread far around. The brilliant *Argynnis lathonia* was common, and the dingy *Vanessa kashmirensis* quite abundant—probably the more distant of yon white peaks to the left arises from its name-place, Kashmir. *Colias fieldii* was also in large numbers, a female exhibiting a symmetrical injury to the hind-wings very suggestive of a peck by a bird. *Precis orithyia* was there too, but *Aulocera swaha* was conspicuous by its absence. Of a humming-bird moth, much smaller than ours, *Rhopalopsyche nycteris*, Koll., I netted three specimens, one at the flowers of a delphinium. *Herbula cespitalis*, Schiff., reminded me of home. The Blues were represented by *Cyaniris singalensis*, Moore. A male *Terias hecabe* was of the wet-season form. I noted that this species is very easy to catch, and is brilliant on the wing; also that when settled on a shrub or flower it is usually extremely conspicuous, but not so when it chooses as its resting-place a certain low plant with oval leaves fading to a yellow tint; then the rounded form of the wings greatly aids its concealment. An old friend, *Euxoa corticea*, Schiff., was taken flying in the sunshine. I had several exciting chases after a big yellow Swallow-tail, and eventually secured one—my first *Papilio*! It proved to be our *machaon*, L., var. *asiatica*, Mén. Here, as in Japan, it scorns fens and dykes, glorying in mountain tops.

On the way down to Narkanda several *Pyramcis indica* disputed the path with our party.

The great resemblance to European forms presented by the bulk of the butterflies seen in this expedition cannot fail to strike the reader.

Solon, circa 5000 ft., to Kálka, 2184 ft.

October 20th, 1903.

Starting from Simla by starlight, soon after 5 a.m., we got to Solon by breakfast-time, and I there caught at 9 a.m. my first butterflies, two *alsus*-like Blues, *Zizera karsandra*, Moore, and *Z. maha*, Koll. Also two flies, a *Musca* of the *domestica*, L., group, and an Anthomyid.

On the drive from Solon to Kálka, by making the most of stoppages to change horses, and by occasionally jumping out of the carriage, I managed to secure quite a lot of things. Among the commonest was the beautiful *Precis ænone*, L., and with it *P. orithyia* and *P. lemonias*. Of *Atella phalanta*, *Belenois mesentina*, ♀, and *Ilerda sena*, I took single examples. *Terias læta*, Boisd., was rather common. There were also *Catopsilia pyranthe*, L., the *gnoma*-form, *Terias hecabe*, and *Huphina nerissa*. About two miles above Kálka, say at about 2700 ft., I got a single *Precis iphita*, Cr. At about the same place the great catch of the morning was made, for I took my first *Hypolimnas bolina*, three males and a female, believing them at the time to be two species. Why does not this glorious insect retain its far more poetical and more appropriate name, *Diadema jacintha*? Surely a black butterfly $3\frac{1}{2}$ inches in expanse with four large glancing-blue spots, one on either wing, deserves to be called after a gem. Anyway, I shall never forget the impression produced by my first sight of its truly oriental splendour; it was like Kingsley's "At last!"

On my way down I also saw *Pyrameis indica*, and missed two *Papilio*s, probably *P. machaon*.

At Kálka I got an hour and a half's collecting late in the afternoon; it was partly on waste ground about the station, but mainly in a field bearing a crop of some kind of pulse with thin pods 4-5 inches long.

A black and brown Cantharid beetle, *Mylabris sida*, Fab., was flying about flowers in the sunshine in large numbers. The genus *Precis* was represented by *orithyia* and *ænone*; the genus *Terias* by *hecabe*, *læta*, and quite a number of *libythea*. The inevitable *Atella phalanta*, never very common, and *Belenois mesentina* were to the front again. *Ganoris canidia* was fairly common; I noted that a male had a "snuffy scent." Single specimens of *Ixias marianne*, Cr., and *Huphina nerissa*, both males, were taken. Of *Cato-*

psilia pyranthe I took two females, one of which had suffered a symmetrical injury to both hind-wings. Three or four *Hypolimnas bolina*, both sexes, were disturbed in their first sleep, and being drowsy fell an easy prey. The Blues were represented by several species—*Zizera maha*, Koll.; *Z. otis*, Fab., var. *indica*, Murray; *Catochrysops cnejus*, Fab.; and *Nacaduba noreia*, Feld. Two Pyrales, *Hymenia recurvalis*, F., and *Bradina admixtalıs*, Walk., and a worn Acidalid were picked up. A Sphinx, *Nephele hespera*, Fab., was taken during the afternoon at the flowers of a *Bryonia*. A little later on, an Arctiid moth, *Artaxa lunata*, Walk., came to the lamp of the railway carriage, to which a Sphinx, probably another *N. hespera*, also paid a momentary visit.

Peshāwar, lat. 34° N., alt. 1165 ft.

October 22nd—25th, 1903.

This city is finely situated in the extreme north-west of the great plain of the Panjāb, or Five Rivers; the mountains of the Sufid Koh and the foot-hills of the Hindú Kúsh bounding the view to the west and north respectively.

In the hotel garden I took a few things; *Terias hecabe* was common, two of them lacked "the dog's head mark." *Belenois mesentina* was represented by a solitary male. One of three males of *Ganoris canidia* yielded a decided scent, hard to describe but certainly not that of *G. napi*. That dingy Skipper *Parnara mathias*, Fab., was abundant at the flowers of *Duranta*. I missed several specimens of a yellow *Papilio*, probably *erithonius*, Cr., and I believe one allied to *podalirius*, L. Of the Blues I took one *Polyommatus bæticus*, and three *Zizera karsandra*, Moore.

Two moths came to light, *Oligochroa akbarella*, Rag., and *Earias tristrigosa*, Butl.

Near the waterworks at Bára, amidst a wilderness of stones, I netted a female *Belenois mesentina*, three Blues, *Tarucus theophrastus*, Fab. (2 ♂, 1 ♀), and my first *Teracolus*, a female *etrida*, Boisd. Dr. Dixey tells me that he had no idea that this species ranged so far north. A strange-looking grasshopper, *Truxalis nasuta*, L., seemed well adapted to its stony desert surroundings.

From Peshāwar my most interesting expedition, from every point of view, was to Ali Musjid in the Khaibar Pass. This tiny white building, said to be the first

Musjid erected in India by the invading hordes of Muhammadan conquerors, stands about 2400 ft. above sea level. Close to flows a little stream full of fish and frogs, which produces an oasis among the hot dry rocks, where large beds of a species of mint attracted a number of butterflies, which I pursued under the strict and curious supervision of those good-natured barbarians, the Afridis of the Khaibar Rifles, who twice a week safeguard the caravans as far as Lundi Kotal.

Limnas chrysippus, L., was fairly common. I took two males and two females, one of the latter with pale ground-colour of an umbreous tint and much shading along the costa. *Pyrameis cardui* was the commonest butterfly, mostly in fine condition. I took one *Ganoris brassicae*, L., of the form *nipalensis*, Gray, a female, and saw several *G. canidia*, which had all possibly strayed from a patch of cultivated ground hard by. The Clouded Yellows were represented by several *Colias hyale*, form *crate*, Esp. The beautiful *Precis orithyia* was quite abundant; *P. almana*, L., also occurred, but was not common. I saw several *Terias hecabe*. The Satyrids were the most interesting of all. A specimen of *Xiphthima balanica*, March, was my first acquaintance in that elegant and delicately-made genus. *Satyrops parisatis*, Koll., a handsome insect suggestive of *Vanessa antiopa*, L., was rather common, but unfortunately much worn. Very conspicuous on the wing it did not appear to be attracted by the mint, but usually settled on the ground, and was then very difficult to see. I also secured two specimens of a very distinct pale Satyrid, much the colour of *C. pamphilus*, L., but much larger and with dentate hind-wings, *Epinephele darcandra*, Moore; they were both ♀. I took two *Polyommatus bæticus*, but saw no Skippers.

Three of that widely-distributed beauty, *Deiopeia pulchella*, L., were seen flying in the sun, and with them a brilliant little Burnet, *Zygæna kashmirensis*, Koll.

Among the outsiders were a locust, *Pæcilocera picta*; a beetle, *Clinteria confinis*, Hope; two bees, *Bombus similimus*, Smith, ♂ and ♀; and a wasp, *Vespa auraria*, Smith (♀).

Malakand, lat. 34° 30' N., alt. circa 3000 ft.

October 28th and 29th, 1903.

By the kind hospitality of the Political Officer, Capt. R. W. E. Knollys, I was enabled to get two days' collect-

ing at this remote frontier post. Perched on a saddle, where the old Buddhist road crosses the foot-hills, looking forward over the Swat valley, back over the dusty plain of the Panjáb, this isolated fortress affords a picture of rocky desolation. The Pass is closed every night by *chevaux de frise*, and the garrison is always prepared for attack. When I went collecting it was deemed prudent that I should be accompanied by a gigantic *chuprassi*, a Pathan of the tribe of the Jusufsai, or Sons of Joseph. Moreover, when scrambling over the hillsides, in addition to the usual Indian thorns in all their varieties, wire entanglements have to be negotiated!

The rocky hills seemed too dry and burnt up to harbour many butterflies, but on the parched slopes of the fortified crag, nicknamed Gibraltar, the pretty little *Melitæa trivia*, Schiff., was almost abundant; on a glaucous shrub at the foot of the same hill were numbers of a glaucous green and yellow locust, *Pæcilocera picta*, which though conspicuous enough on the wing was decidedly cryptic. Other Ornithoptera were *Quiroquesia blanchardianus*, Sauss., and *Truxalis nasuta*, L. I also took three wasps, two *Vespa velutina*, Lep. (var. "*des Indes*," Sauss.) ♀, and a ♀ *Polistes hebraeus*, F.

In addition to the above a long and hot walk only yielded one *Ganoris canidia*, ♂; two *Terias hecabe*, a ♂ of the variety without the "dog's head," and a large but otherwise normal ♀; two Blues, a *Zizera karsandra*, Moore, and a *Z. maha*, Koll., var. *diluta*, Feld.; one *Precis orithyia*; a dingy Skipper, *Gegens nostrodamus*, Fab., and a micro, *Tinægeria*, sp. Some puddles of water at the baggage-mules' drinking-place proved very attractive, yielding *Argynnis niphe*, a ♀, *Tarucus theophrastus*, F., a ♂, and the conspicuous *Hipparchia parisatis*.

The next day (Oct. 29th) I lighted upon an oasis in the desert in the shape of the staff-sergeant's garden, where irrigation had produced a brilliant mass of flowers, some vegetables, and a small field of lucerne. Here butterflies abounded: *Terias hecabe*, without the "dog's head mark," was in plenty among the lucerne as well as at the marigolds; the lucerne also yielded both *Colias fieldii* and *C. erate*, the eastern form of *hyalc*. Among the Danaids *Limnas chrysippus* was common, and *D. genutia*, Cr., abundant at the marigold flowers, at which also one *Tirumala limniace*, Cr., was taken. *Athyma perius*, Linn., was rather com-

mon, but preferred the wet mud left in the irrigation channels to any flowers. *Argynnis niphe* was also common, but had more refined taste, and was usually taken on the marigold beds; its female was observed during life to resemble *L. genutia*. *Precis almana* was common; *P. orithyia* very abundant at the same flowers, together with a few *P. ænone*, one of them very fine and large. As usual in India *Atella phalanta* and *Belenois mesentina* put in an appearance, the first at marigold, the second (a ♂) among the lucerne. The Hairstreak *Ilerda sena* occurred alike at marigold and high up on the mountain-side. The flowers of *Gaillardia* proved more attractive to the smaller fry than the coarser marigolds; the brown Skipper, *Parnara mathias*, Fab., was in abundance, so were the dingy Blues, *Zizera karsandra*, Moore, and *Z. maha*, Koll., but the latter and its variety *diluta*, Feld., preferred mud to any flowers.

Other small things were *Polyommatus bæticus*, and the Skipper *Gegenes nostrodamus*, Fab., which was common at the flowers of *Gaillardia* and marigold. I saw this species at Malakand only, and unfortunately secured but two specimens. Two or three *Melitæa trivialis* also turned up at these favourite flowers. Not far from the garden I took two more *Hipparchia parisatis*; this does not appear to be much attracted by flowers, but settles on the ground and is then often very hard to see. I observed it lean over from 20° to 30°, and even saw it walking about with a "list" of 20°.

Lahore, lat. 31° 35' N., alt. circa 700 ft.

October 31st—November 4th.

At the capital of the Panjáb, a city of the plains, my chief collecting ground was the extensive Lawrence Garden, which though full of flowers is, in parts, so wild that, not to mention a mongoose, I even came across a jackal at midday. The class of butterflies found here differed widely from those met with at Simla and further north, the predominant forms being Oriental. Here I first captured *Papilio erithonius*, Cr., the "tailless swallow-tail," which I had perhaps seen at Pesháwar; this butterfly has a wide range in India and might almost be termed abundant, it especially frequents the flowers of *Zinnia*,

Lantana, and *Bougainvillea*. When feeding it settles for a few moments only, fluttering with its wings the while; then it is not hard to catch, but when rushing from place to place it is far otherwise. In colouring it is very like *P. machaon*, but far less handsome; the yellow ground-colour is often quite pale and bright when the insect is fresh, but it usually turns much darker and duller; I suspect that cyanide hastens this process. At Lahore also I first came across another very common Indian butterfly, *Papilio pammon*, L.; its graceful form and flight and rich velvety-black coat at first excited me so much that I had great difficulty in catching it! Naturally enough I followed Linnæus in taking the sexes for different species: he called the male *pammon*, and the very different female, Wallace's second form, *polytes*. At Lahore it especially affected the flowers of *Bougainvillea* and a shrub with blossoms like in colour and scent to, but much larger than, those of white jasmine. Like *P. erithonius* it flew rapidly from flower to flower and fluttered while feeding. The female taken here was of Wallace's second form (*polytes*); among the males was a dingy variety with scarcely any orange on the under-side of the hind-wings.

Limnas chrysippus was abundant, more especially at the flowers of *Asclepias* (the food-plant); amongst them was a dwarf female. *Tirumala limniace* was scarcely common.

Of *Catopsilia pomona*, F., I only netted one female, but believe I saw others; it visits flowers high up on trees. *C. pyranthe* was abundant; it flies fast and high and is hard to catch: it was fond of settling on the flowers of *duranta* on the tops of high hedges, forming a pretty contrast with the lilac-blue racemes.

Terias hecabe, both sexes, was fairly common; it flew slowly and near the ground. The black and white *Teracolus puellaris*, Butl., was also fairly common; perhaps it owes its name to the child-like simplicity of its dress. It flies near the ground, but so jerkily as to be somewhat hard to catch. It has the habit of flying *into* bushes, by preference those well provided with thorns, and not coming out again. Of *T. protractus*, Butl., I could only get two specimens; its salmon-pink colour with broad black margins dusted with blue-grey make it one of the most beautiful little butterflies that I came across; its dress is all in exquisite taste, the under-side being a quiet greenish-yellow that must greatly protect it when at rest.

White butterflies were not much in evidence; I took a somewhat worn female of *Appias libythea*, Fab., also two *Belenois mesentina*, both females. This last is another common Indian butterfly; its upper surface reminds one of *P. daphidice*, L., but beneath the hind-wings and tips of the fore-wings are bright orange with brownish veins. Experience at Lahore confirmed me in the opinion that "Whites" of all sorts are most difficult to catch; they are shy, and fly rapidly with a jerky vertical movement. "Whites" are by far the most conspicuous butterflies, especially when at a distance, and doubtless they need their swift wings. The Catopsilias are nearly as conspicuous as the true Whites, and they fly even more swiftly.

Among the Nymphalids the widespread *Atella phalanta* was represented by a few specimens at marigold flowers. *Precis orithyia* (an insect that suffers much loss of beauty from grease) was not common, the same is true of *P. almana*; a few of each were taken at flowers. At zinnia flowers I got my first *Hypolimnas misippus*, L., a male; it impressed me as a most tropical-looking insect, though not so gorgeous as *H. bolina*; it had both hind-wings clipped, possibly by a bird.

The Blues were represented by two species—the neatly-marked *Tarucus telicannus*, Lang., common at the flowers of *Plumbago*, and the little greyish-blue *Zizera maha*, Koll., abundant at the flowers of a species of millet and some herbs of the labiate family; amongst them was a specimen of the var. *diluta*, Feld. Blues swarm in India, many of the species are small and dingy, so that they are hard to follow on the wing, and their flight is even more jerky than that of Whites. They are often found on grassy banks as at home, but are especially addicted to water-drinking and are constantly present in irrigated fields and gardens. It must be confessed that the abundance of bigger game often led one to pass them by. Blues when killed are apt to fold their wings the wrong way, and it is difficult to set them right; but if only kept a short time in the bottle with a view to preventing this untoward result, they are apt to recover and fly away when the paper is opened after the day's work.

The dull-coloured Skipper *Gegenes nostradamus*, Fab., was common in the gardens, but I only took one female. Small moths, especially Pyrales, were abundant in a patch of long grass and herbage in a damp spot. One of these

was *Pyrausta incoloralis*, Guen., another the tiny Gold-tail, *Porthesia marginalis*, Wk., which was flying in the sun. There was also the very widely-distributed *Marasmia trapezalis*, Guen.; but by far the commonest was the pretty little black-and-white *Hymenia recurvalis*, Fab. (very suggestive of our *E. cingulalis*, L.).

In the gardens of the Shah Dara, Jehangir's mausoleum, four miles from Lahore, I saw at dusk a number of Hawk-moths at the yellow tubular flowers of a small tree. My short-handled net only allowed me to catch two, which proved to be beautiful specimens of *Nephele hespera*, Fab., and *Charocampa celerio*, L.

In writing to Dr. Dixey from Lahore I made the suggestive remark: "It is evident that being late in the autumn many of the butterflies are old and much worn. Curiously enough they are more often tattered and torn than actually rubbed." It is difficult to rightly apportion the breaking of the wings between the work of thorns and insectivorous foes. Certainly Indian butterflies fly into and through bushes in a way that one does not see at home.

In the Ajáib Ghar, or Wonder House of Lahore, Anglicé Museum, well known to readers of "Kim," is a small collection of insects. This was useful to me, but the destruction wrought by *Dermestes*, etc., both among the insects and the textile fabrics of the Industrial Collection, is most sad to see. I trust Mr. Kipling will see to it.

Amritsar, lat. $31^{\circ} 40'$ N., alt. circa 750 ft.

November 5th and 6th, 1903.

At the sacred city of the Sikhs my collecting was practically confined to two gardens close to the hotel. Here a large dull brown butterfly, with somewhat of the *Vanessa* habit, spread itself perfectly flat upon the surface of the earth and more especially of the damp mud of the little irrigation channels, lying so close to the surface as to be with difficulty discerned, so exactly did it resemble the tint of the mud. I secured three which proved to be *Euthalia garuda*, Moore, all females.

Papilio pammon was common; besides males I took one female of Wallace's Form I, which differs but slightly from

the male and is hence termed *pammon pammon*. Of *Precis almana* I took one, of the ubiquitous *Belenois mesentina* likewise one, a female, but I was somewhat surprised to net a *Colias fieldii*, ♀, since the great plain of the Panjáb seemed an unlikely locality for a *Colias*.

Ypthima narelda, Koll., was scarcely common in the hotel garden, it flew close to the ground. The list closes with *Polyommatus baticus* and a grasshopper to which Mr. Kirby cannot assign a name.

Delhi, lat. 28° 30' N., alt. circa 700 ft.

November 7th—12th, 1903.

When collecting in the Kudsia Gardens at Delhi it was impossible not to be impressed with the historic associations of the ground. Lying between the northern walls of the city, the famous ridge, and the mighty Jumna, scarcely more than a furlong from John Nicholson's grave, stands, nearly hidden by trees and flowering shrubs, all that is left of the Summer Palace of the kings of Delhi. Its crumbling walls, where not covered by Bougainvilleas or other creepers, bear testimony by many a bullet-mark and round-shot hole how fire-swept the place was during the long hot days of 1857. Concrete blocks with suitable inscriptions mark the sites of the breaching batteries of the last stages of the siege—batteries placed strangely near the walls when measured by the range of modern guns, for yon breach in the Water Bastion is scarce two hundred yards from the most advanced battery!

Here in a beautiful garden, the very ideal of quiet and peace, where the numerous grey-striped squirrels are quite tame and the greenest of parrots and the crested hoopoes look as if war were unknown upon earth—here I watched many gorgeous *Papilio aristolochiæ*, Fab., fluttering upon the flowers, or sailing over the trees; at one moment looking like black *crêpe* against the light, at another displaying a circlet of brilliant rubies beneath. Once I had three together in my net! With these were a few *P. erithonius* and *P. polytes*, the latter females of Form II.

Limnas chrysippus was also common, one, a male, was unusually small. *Crastia core*, Cr., was common in shady places under mango trees, but was rarely seen at flowers. The pretty little black and salmon-coloured *Teracolus*

calais, Cr., was abundant alike in the Kudsia Gardens and close to the hotel, flying near the ground yet not so easy to catch. One of them was very small. Of *T. puellaris* I only saw two. The "wet season" form of *Terias hecabe* was abundant, flying low and about bushes.

Of the brilliant yellow and orange *Ixias pyrene*, L., I took but one; the less gaudy Orange-tip, *I. marianne*, was rather common, but some of them were worn and none very easy to catch. The genus *Catopsilia* was represented by one worn male *pyranthe*, and I took my first *Delias eucharis*, Dru., a very worn female. The common Whites were *Huphina nerissa*, all males, and *Belenois mesentina*, which was abundant at flowers. The slender little *Nychitona xiphia*, Fab., flitted weakly along close to the ground, reminding me irresistibly of *Leucophasia sinapis*, L., in spite of all structural differences. One of these ghostly creatures was taken flying over a tablet that marked the site of "Battery No. IV. Left attack; mortars." One wondered whether there were any butterflies in that place during the terrible summer of 1857.

Three or four *Precis lemonias*, L., appeared to be rather fond of shade, they settled upon the ground in preference to flowers and then were hard to see. Of the gorgeous *Hypolimnas bolina* I saw one of each sex; it needed an effort to believe that they were one species.

The Blues included *Catochrysops enejus*, Fab.; *Tarucus theophrastus*, Fab.; *Chilades varunana*, Moore; and *Chilades laius*, Cr., this last was common. The only Skipper taken was *Telicota augias*, L.

A little geometer, like a *Macaria*, was common among herbage, *Semiothisa fidoniata*, Guen., and one specimen of *Tephrinia disputaria*, Guen., was taken in like situation. *Semiothisa fidoniata* also came to light, along with *Oligochroa akbarella*, Rag. Can M. Ragonot have intended a deliberate insult to the memory of the great Emperor when he named this dingy and insignificant little Phycid after him?

Other moths taken in the Kudsia Gardens were the tiny Noctuids *Metachrostis badia*, Swinhoe, and *Earias tristrigosa*, Butl., which was common among bushes near a back-water of the Jumna.

In the verandah of the hotel I took a fine *Sphinx orientalis*, Butl., the eastern form of *convolvuli*, L.; it had probably been attracted by the lights the night before.

Lálkot. November 10th.

Eleven miles south of Delhi lies this glorious city of ruins, and there, under the shadow of the Kutb minar, flying over the stones and amidst the thorny vegetation were many Whites and Orange-tips. The butterflies appeared especially to delight in flying about inside the thorniest bushes, or even flying through and through them, so that torn wings were almost the rule. Prominent in the countless crowd of *Belenois mesentina* so employed were *Ixias marianne* and *I. pyrene*; a female of the former was distinguished by the substitution of cream-colour for white in the ground-tint of the wings. The delicate-looking *Teracolus ctrida*, lover of ruins, was in abundance, flying close to the ground.

I saw one black *Papilio*, one *Limnas chrysippus* and one *Preccis lemonias*.

Náini Tál, lat. 29° 30' N., alt. 6500 ft.

November 16th—23rd, 1903.

Unlike Simla and Darjiling, which stand astride lofty ridges, Náini Tál lies in a basin by a lake, a situation which, however pleasant it may be in summer, gives it in late autumn a dank feel. In summer it affords good collecting, but in November I found but few insects and those mostly battered and forlorn looking. The fauna, though more Oriental than at Simla, a degree and a half to the north, was much more Palæarctic than at Lahore, which is yet half a degree north of Simla, but of course upon the plain.

A very clear picture remains with me of a bright sunny afternoon, with a raw chill in the air very suggestive of home. On the one hand were rhododendrons and Thujas growing as forest trees, and hard by cactus-like Euphorbias some fifteen feet in height; on the other, poplars were shedding their golden leaves in bright contrast to the crimson of the wild *Ampelopsis* (I cannot call it "Virginian" creeper), a "Brimstone"* butterfly dashes wildly past, then a belated "Tortoiseshell"† or "Red Admiral"‡ darts

* Probably *Gonepteryx rhamni*, var. *nipalensis*, but possibly a *Catopsilia*.

† *Vanessa kashmirensis*.

‡ *Pyrameis indica*.

up from the path only to return again to the same stone, while several "Small Coppers" (*Chrysophanus pavani*) disport themselves about the autumn flowers on the bank. Quite a Palæarctic picture surely!

In addition to these I found at Náini *Terias hecabe*, the Hairstreak *Ilerda sena*, Moore, and the Blue *Zizera maha*, Koll., also the Fossor, *Pompilus analis*, Fab., ♀, while *Agrotis flammatra*, Guen., came to light.

A climb to the top of China Peak (pronounced Cheena), 8568 ft., produced two more Palæarctic forms, *Argynnis lathonia*, var. *issæa*, and *Lycæna bætica*.

Five days were spent on horseback in an expedition into Kumáon as far as Ranikhet and Cháubattia, some twenty-four miles north of Náini as the crow flies. The road, at first slippery with ice so as to compel us to dismount, falls rapidly to Kháirna (Kháirana, or Khyrna, for the spelling seems uncertain). At about 6000 ft. *Ilerda sena* was again met with, at about 4000 ft. *Neptis astola*, Moore, and *Terias hecabe*. When near the bottom our eye was caught by the fluttering down of shells from a large pod-bearing tree. On looking up we saw about a dozen charming-looking greenish monkeys, their little black faces set off with most becoming white frills. It did not take them long to strip that tree of every pod.

At Kháirna, 3200 ft., a tiny village in a deep and narrow valley, I had a little time for collecting, but it was limited by the steady march of the great chill mountain shadow, which sent all butterflies quickly off to bed. *Precis orithyia* was common, but the specimens were very small; *P. ænone*, *P. lemonias* and *P. iphita* were also seen, the latter at flowers, not a usual habit of the species. Several *Athyma perius* were seen, also several *Catopsilia pyranthe*; of those taken one was the *gnoma*, the other of the *pyranthe* form. Of *Ganoris canidia* and *Tarucus telicanus*, Lang, I took one each, but *Zizera maha*, Koll., was in abundance. In addition to these were *Deiopia pulchella*, flying for short distances about low herbage according to its wont, and a fly which hovered at flowers just like a Sphinx—a *Bombylius* not in the National Collection. The widely-distributed locust, *Thisioicetrus littoralis*, Ramb., which was very common, had the curious habit after its short flight of settling so brusquely upon a shrub as to make its branches shake, but then quickly making its way to the ground. I missed a *Macroglossa* twice at the same bush.

Late in the afternoon I took a *Papilio pammon*, a female of Wallace's Form II. *polytes*, which was flying about and into bushes, apparently seeking for a resting-place for the night, but possibly seeking where to lay its eggs.

Close to the village of Kháirna I saw upon the cliffs by the roadside several beautiful lizards, grey-spotted, with bright blue legs.

On the long and hot way up again from Kháirna to the ridge on which stand Ranikhet and Cháubattia, a dwarf *Precis orithyia* and a *Neptis astola*, Moore, were taken at about 3500 ft., and at about 4000 ft. *Belenois mesentina*, *Pyrameis indica*, and *Ilerda sena*.

At Ranikhet, 6000 ft. (where, by the way, the cooking at the Dák Bangla was the best that we came across in India), monkeys were not uncommon in the woods, but unlike our legumen-loving friends of Kháirna, of a revoltingly ugly type; butterflies, however, were scarce, and were represented by *Pyrameis cardui*, *Vanessa kashmirensis*, *Ilerda sena*, and *Lycæna maha*, Koll., var. *diluta*, Feld.

At Cháubattia, four miles to the east of Ranikhet, and at a height of about 6200 ft., the officers' quarters command a most glorious panorama of Nanda Devi, 25,749 ft., Nanda Kot, 22,491 ft., and Trisúl, 23,581 ft., mountains of unsurpassed grandeur of form and held most sacred by pious Hindus as sources of Holy Ganges. These stand between fifty and sixty miles away, yet shine forth as clear and bright as if close to. Here there were rather more butterflies, viz. our old friends *Terias hecabe*, *Precis ænone* and *P. lemonias*, *Pyrameis cardui*, and *Chrysophanus pavana*, and in addition something quite fresh, the Erycinid *Dodona durga*, Koll., of which I got three specimens; though a small insect it proved tenacious of life. A little beetle, *Oides* sp., was taken flying over the road.

On descending again from Náini to the plains one found, as at Simla, that butterflies got more numerous and more Oriental in character. At the top of the road the Hair-streak, *Ilerda sena*, was common; at 5000 ft. *Yphthima philomela*, Joh., was met with; at the Brewery, circa 4500 ft., butterflies were very common at a flowery turn of the road, and I took *Pyrameis indica*, several *Precis iphita*, *P. lemonias*, and a male *Hypolimnas bolina*, while I missed a brown-and-white *Neptis*-like butterfly which may have been *Rahinda sinuata*, Moore.

Lucknow, lat. 27° N., alt. circa 500 ft.

November 24th and 25th, 1903.

Lucknow possesses a museum containing a fair collection of insects, which would have been more instructive to me if a majority of the species had been named.

My scanty collecting was almost confined to public gardens. Near the hotel was a small institution, either a children's orphanage or hospital, and in the garden attached thereto *Hypolimnus misippus*, ♂, was rather common, but shy and worn; I took a battered one. Of *H. bolina* I took a female. Of *Delias eucharis* the males were common at *Zinnia* flowers. Odd specimens of *Papilio aristolochiæ* and *Parnara mathias*, Fab., also occurred.

In the beautiful garden of the Dilkusha Palace, where Havelock fell sick of the illness that was to prove fatal in the very hour of triumph, there was a great wealth of flowers and consequently a great assemblage of butterflies. Besides such things as *Papilio erithonius*; *Argynnis niphe* (a ♀); *Hypolimnus misippus*, several males; *Crastia core*, both typical and the variety *vermiculata*, Butl.; and a *Catopsilia* which evaded capture, I took there my first *Rapala melampus*, Cramer. This is a small copper-coloured butterfly belonging to a genus which, with its robust body, sharp-cut wings, and curious anal lobe to the hind-wing, looks very different from our Hairstreaks or Coppers. It is neither easy to see on the small flowers which it frequents, nor to catch.

Other butterflies taken in the same garden were the Blues *Catochrysops strabo*, Fab., and *Tarucus telicanus*, Lang, the latter abundant; *Mycalesis perseus*, and the brilliant tawny Skipper *Telicota augias*, L. A beautiful little Noctua with yellow under-wings, *Hyblæa puera*, Cram., was taken at flowers in full sunlight. The Blue *Zizera argia*, var. *similis*, Moore, was in abundance. I also took a locust, *Gastrimargus marmoratus*, Thun., a species of wide distribution.

By the roadside between Dilkusha and La Martinière a few *Chilades putli*, Koll., a very small brown Lycænid, were obtained.

At the Alumbagh, ever to be remembered in connection with Colin Campbell, the dry-season form of *Terias hecabe* was flitting quietly about, and I netted *Ixias marianne* (not so vulgar-looking as its name might lead one to

expect), also a variety of the female of *I. pyrene* without the orange-tip. A male of the wet-season form of *Huphina nerissa* was also taken, while *Delias eucharis* was common, a specimen feeding on *Zinnia* flowers close to Havelock's grave. *Deiopeia pulchella* was flying commonly in the sun amongst the grass, and with it a specimen of *Argina cribraria*, Clerck. The Coleoptera were represented by *Mylabris sidae*, Fab., and the Micros by a Pyrale, *Pyrausta juncturalis*, Wlk.

In the Presidency garden I took only a worn *Acidaliid* and the common Cantharid beetle, *Mylabris sidae*, Fab., which was seen in some numbers flying about the flowers of a species of *Hibiscus*.

Benares, lat. 25° N., alt. 270 ft.

November 28th—December 2nd, 1903.

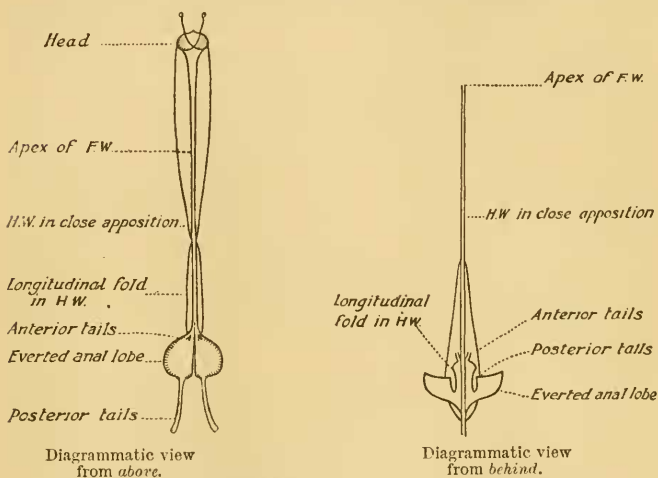
The sacred city of the Hindus proved more remarkable for the number and variety of its pilgrims than for its butterflies. In the hotel garden, where jackals howled loudly by night, a few battered specimens of *Papilio erithonius* were seen by day, and the males of both species of *Hypolimnas* were fairly common. Of *H. bolina* I took a fine female, while of *misippus* I also sent home a female which is marked "common." It is, however, certain that I did not know this insect to be a *Hypolimnas* at the time, since I only learned from the Calcutta Collection that the female of *misippus* was brown! There is therefore little doubt that I took it for a variety of *Limnas chrysippus* which it mimics in such a surprising manner, and which certainly was common enough in the same garden. It is one of the inconveniences of the method of enveloping that so much is left to memory, and the chances of comparing insects are so very few. Dwarfed specimens of *Precis orithyia* were now very common; *P. ænone* and *P. lemonias* were less common but almost as small. Several *P. almana* occurred. But in spite of the excessive drought and the consequent occurrence of dwarfs, one of my specimens of *Terias hecabe* taken at Benares was quite of "wet-season" type. *Catopsilia pomona* was represented by a very large male of the typical form and a smaller female in fine condition, exhibiting the transition to the *catilla*, Cr., or extreme dry-season form. Similarly *C.*

pyranthe was represented by a male of the typical and a female of the *gnoma* form.

Together with the above were several smaller things: among the Blues *Polyommatus baticus* occurred, while *Catochrysops strabo*, Fab., and the tiny *Chilades putli*, Koll., were both common. The Skipper *Parnara mathias*, Fab., was also common, and I took one *Telicota augias*, L. The little Pyrale, *Hymenia recurvalis*, was in some numbers in one small flower-bed. Of the long-waisted wasp, *Eumenes esuriens*, F., I saw but one ♀.

APHNÆUS ELIMA, Moore.

Enlarged from sketches from the living butterfly.



Drawn at Benares, November 30th, 1903, by G. B. LONGSTAFF.

But among the frequenters of the small garden adjoining the hotel those that interested me most were the "lobed" and "tailed" *Lycænids*, of which there were no less than four species. Of *Aphnæus ictis*, Hew., I took but one, a male, of *A. elima*, Moore (which, however, De Nicéville considered to be only a dry-season form of *ictis*), I secured two, also males. Of the third species, *Pratapa deva*, Moore, I took but one, and that had lost the anal angles, with their appendages, and a large part of both hind-wings, which had apparently been bitten off, absolutely symmetrically, by a lizard. The fourth species, *Rapala melampus*, Cramer, was common, and I secured seven specimens, all, however, males.

Concerning *R. melampus* I wrote to Dr. Dixey at the time: "The Tailed Copper (or Hairstreak) first seen at Dilkusha, Lucknow, and found commonly here to-day, greatly interests me. Not only is it very beautiful, but it is surprisingly hard to see, especially when at rest. Then the structure of the hind-wing is most strange; posterior to the tail (the next interspace but one) a portion of the wing nearly circular, with a very obvious fringe of large scales, is set at right angles to the plane of the wing and to the direction of the veins."

According to Schatz and Röber* this "anal lobe" occupies the space between the sub-median and inner marginal veins; the second anal and third anal of Comstock; 1*b* and 1*c* of Meyrick; but I have not found in these authors any allusion to the striking fact that this lobe is quite out of the plane of the wing. This omission may be due to the fact that the process of setting usually flattens the lobe out so that it is hardly seen in cabinet specimens. It did not occur to me at the time (and the suggestion arrived by letter too late) that the object of this structure is possibly to produce the appearance of a head in a non-vital part, the tails representing the antennæ. However, drawings made at the time strongly bear out the suggestion. The resemblance would be still more striking if these *Lycænids*, like so many of the family, habitually rest with the head downwards.

In another letter from Benares I said: "Thorns are not specially bad here, only that one does not know the look of many thorny plants until too late. But, on the other hand, burrs of every sort and kind abound to an incredible degree and tangle up the net; much of one's time is spent in freeing net and breeches therefrom."

It might have been added that at Benares I first made acquaintance (somewhat intimate) with "spear-grass," which is yet more provocative of bad language than either thorn or burr.

Some three miles from Benares, on the way back from Sarnáth, where Buddha first taught, I found *Delias eucharis* in extreme abundance in a small field of the tall marigold which is so much cultivated for the service of the temples. A truly gaudy sight it was to see crowds of these white, yellow, and scarlet butterflies upon the orange-coloured blossoms.

* *Die Familien und Gattungen der Tagfalter*,

Calcutta, lat. 22° 30' N. Near sea-level.

December 4th—12th, 1903.

Naturally one could not expect to turn up anything new at Calcutta, the capital of India, and long the home of De Nicéville, that martyr to science who met his death in the deadly Terai when in pursuit of his favourite butterflies. However, I determined in the few days at my disposal to get at any rate a sample of the fauna of Lower Bengal.

The Eden Gardens, abutting on the Maidán and close to Government House, bear much the same relation to Calcutta as Kensington Gardens to London, and from their proximity to the hotel afforded a convenient collecting ground for odd hours.

The *Duranta* was nearly over and the most attractive feature proved to be a hedge of *Lantana* in full bloom. These dissimilar plants both belong to the *Verbenaceæ* and are both natives of the West Indies, although the latter appears to have run wild in many parts of India. On that hedge *Limnas chrysippus* was in abundance, accompanied by *L. genutia*, which I had not seen since I was at Malakand, while numerous *Tirumala limniacæ* and *Crastia core* completed the company of the Danaids. I was able to confirm my Benares observation that the male of *L. chrysippus* has a slight but decided odour suggestive of cockroaches, which is perhaps stronger when the scent sacs on the hind-wings are opened, though of this I am not sure. On the other hand, the male of *C. core* has a faint scent that suggested to me rancid oil, or old lamps. So far as I could judge the scent is connected with the hind-wings but *not* with the very conspicuous genital tufts.

At the *Lantana* flowers along with the Danaids were abundance of *Suastus gremius*, Fab., a somewhat dingy Skipper, also a few of the brilliant and conspicuous *Delias eucharis*. The upper-side of the female of this species faintly mimics *Tirumala*; the male yielded on rubbing the wings a sweet flowery scent, which I was not at first able to describe, but later it struck me as resembling that of our domesticated *Ganoris rapæ* and suggestive of sweet-briar. Dr. Dixey informs me that scent-scales are very numerous in *Delias*.

In the shadier parts of the garden together with numerous *Terias hecabe*, one at least of markedly wet-season type, and many *Ypthima hübnéri*, Kirby, several *Nychitona xiphia* were found, which, as ever, reminded me of

Leucophasia sinapis, a slender form and fragile appearance being in each case associated with a weak flight close to the ground. One of the *Y. hübnéri* had the whole hind margin of both secondaries bitten off nearly symmetrically.

Catopsilia pyranthe and *C. pomona* were both met with, the former the more frequently. No *Papilio* turned up although I was told that *P. pammon* occurs in the garden. Amongst young palms the males of *Elymnias undularis*, Dru., were occasionally disturbed, and a very striking thing it is. Then *Nepheronia hippia*, F., came along, flying strongly, the male looking on the wing, or more especially when settled on a flower with wings expanded, much bluer than its cabinet appearance might lead one to suppose. Three *Limenitis procris*, Cr., required some catching, preferring the leaves of tall shrubs to flowers; but it is scarcely as graceful on the wing as our White Admiral.

I took two specimens of *Catochrysops pandava*, Horsf., var. *bengalia*, De Nicév. (being the dry-season form); the female is a dingy creature, but the male is of an iridescent blue, bordered with black. *Hypolimnas misippus*, ♂, *Precis almana* and *P. lemonias* completed the list of twenty species taken in four visits to the gardens. With them was a bee *Elis thoracica*, Fab., a ♀.

Báliganj.

At the truly splendid museum (where, by the way, I saw a native artist at work producing some of the very best coloured figures of beetles and butterflies that I have ever seen), Mr. S. E. Peal, besides helping me in other ways, put me on the track of one of the late Mr. De Nicéville's favourite collecting-grounds, a *rus in urbe*, at Báliganj, a suburb only three miles from the hotel. I visited this place twice, on December 5th and 9th. It consists of a large deserted garden long run wild; weedy meadows and jungly woods are all that is left of trim lawns and ordered shrubberies, while a palm avenue and several tanks covered with a floating flower of the convolvulus order, harbouring countless dragon-flies, complete the tale of departed greatness. Altogether it is full of sad beauty. Palms and crotons with an undergrowth of ferns were the characteristic plants, flowers were few, yet in certain favoured spots butterflies were in quite bewildering swarms. The quiet charm of this old garden was greatly enhanced by the absence of curious natives and the (comparative) absence

of burrs, that curse of "up-country" collecting, though the unsuspected prickles of innocent-looking palms to some extent took the place of the latter.

Some of the species seen near the centre of the city, in the Eden Gardens, were conspicuous by their absence, e. g. *Limenitis procris*, *Precis lemonias* and *Hypolimnas misippus*.

The four common Danaids, *Tirumala limniace*, *Crastina core*, *Limnas genutia* and *L. chrysippus*, were not so common as might have been expected, probably owing to the scarcity of the flowers they love. In the last-named species I was able once more to confirm the presence of a distinct, but not strong, odour suggestive of cockroaches. A few *Papilio polytes*, both sexes, gave to the assemblage that air of distinction which the genus always has. Among the more sombre things, most frequent under the shade of groves, were a number of *Mycalesis indistans*, Moore, together with one *M. perseus*, Fab., which so far as observed have no "list" when at rest. In the shade also were two or three *Melanitis ismene*, Cr. Close down among the herbage together with *Ypthima hübnéri* there were flying large numbers of *Y. philomela*, certainly a gregarious species.

Precis almana was noted and *P. atlites*, Joh., here came under my observation for the first time, but in poor condition; it is then a rather ghostly-looking butterfly though a somewhat strong flier; this last is also true of *Atella phalanta*. A single specimen of my old Amritsar friend *Euthalia garuda* was observed, as before, to settle with its wings fully expanded and closely appressed to the ground. *Elymnias undularis* was in abundance; it is especially addicted to the characteristically Indian butterfly habit of flying into or through bushes, and even of flying about inside bushes. It is clearly gregarious, several specimens flying about and in one palm-bush, its food-plant. The male is very striking on the wing, and when settled, even though the under-side is somewhat leaf-like, it is yet quite conspicuous. The female, on the other hand, is on the wing a very fair mimic of *Limnas genutia*, but its flight is weaker.

Catopsilia pyranthe and *C. pomona* were both rather common; *Terias hecabe* was abundant, and, as usual, gregarious.

In half-shaded spots an occasional *Nychitona xiphia* flitted slowly along close to the ground. *Ergolis ariadne*,

L., was abundant, of *E. merione*, Cr., two specimens were secured. The butterflies of this genus settle with the wings three-fourths expanded.

Nepheronia hippia was rather common; though its female somewhat mimics *Tirumala limniace*, the male, when on the wing, looks much bluer than that insect.

A brilliant fulvous Skipper, *Telicota bambusæ*, Moore, was the only representative of the group, but there were several Blues, to wit *Catochrysops strabo*, Fab., which was common; *Lampides celeno*, Cr., larger than usual, one being of the form *alexis*, Stoll.; and *Neopithecops zalmora*, Butl., was common. A single example of *Curetis thetys*, Dru., fell to my net, apparently bitten by some enemy; its silvery white under-side is very striking. But perhaps the strangest-looking butterfly of the lot was *Loxura atymnus*, Cr., of which I got two. Its wings are much plaited longitudinally, and when at rest its extremely long tails, crumpled look, and brown colour give it quite the look of a dead leaf. A closer examination shows that the portion of the hind-wing near the anal angle is bent down, or back, nearly to a right angle; this bent portion is, however, relatively smaller, more oval and less sharply bent than the rounder anal lobes of *Rapala* and *Aphnæus*; moreover it is not furnished with the very large marginal scales which are so conspicuous in those genera.

Toliganj. December 7th, 1903.

About two miles from Báliganj, and due south of Calcutta (about half-a-mile beyond the Sports Club), is the locality referred to as Toliganj. Here too is an old abandoned garden, but lacking the elements of departed grandeur that give a poetic colouring to De Nicéville's old hunting-ground. The prominent features are a great profusion of *Lantana* in full bloom, a bamboo grove and a good deal of thorny jungle. The day that I was there the *Lantana* was the chosen haunt of great numbers of the bigger butterflies such as *Delias eucharis*, *Tirumala limniace*, *Limnas genutia*, *Papilio pammon*, mostly worn, *P. aristolochiæ*, and a few *P. erithonius*, together with an occasional *Nepheronia hippia*, with his broad wings proudly expanded to view. The sight of these big fellows, expanding from three to four inches, quietly settled on the flowers, or fluttering after the manner of *Papilio*, or grandly sailing around gorgeous in their white, yellow and scarlet,

black and grey blue, mahogany-brown and black, black and cream colour, black and coral-red, black and yellow, or sky-blue and black, afforded indeed a glorious sight not soon to be forgotten. Alas! such a tropical glory takes much colour out of the most vivid mental pictures of butterfly life at home.

In a shady grove not far from these flowers *Limnas genutia* was simply swarming, as many as ten or even twenty being in sight at once, for it is one of the most gregarious butterflies that I have met with. A few observations on this species and *Tirumala limniace* failed to detect any odour, but it was far otherwise with *Delias eucharis*, of which several specimens had a distinct sweet scent, very like that of *G. rapæ*. My strong impression is that this scent is confined to the male, but I cannot, unfortunately, speak with certainty on the point. The male of *Huphina nerissa* has a distinct scent, also like that of *G. rapæ*, although the butterfly more resembles *G. napi*. The scent of these two butterflies is neither so strong nor so unmistakably characteristic as that of *G. napi*, but its existence is quite beyond question.

These scents are not easy to deal with. The human nasal organ is but a poor affair at best, moreover scents are very hard to describe, and these butterfly odours are only suggestive of, certainly not identical with, those to which I have, for want of any better standard, compared them. Then the scents are transient and may easily be scattered by the wind or overpowered by neighbouring flowers. Again the scales, independently of any scent, are irritating to the mucous membrane. Lastly, any one who has tried to use the sense of smell for diagnostic purposes must know how even the most volatile perfume is apt to linger on, lurking as it would appear in the cavernous recesses of the nose. Of course it is much easier to determine in the field whether or no a scent is sexual in those species in which the sexes are distinguishable by very obvious characters. Lastly, it should never be forgotten that in all probability the scents described are far more obvious to the insects themselves than to human observers.

Only a solitary representative of the *Euploea* group appears among the Toliganj specimens, but its envelope bears the note: "Common, has a slight peculiar scent, rather disagreeable." Most probably I believed this at the time to be the common Calcutta species *Crastia core*, but it turns out to be *Pademna kollari*, Feld., and it is now

impossible to say what those that I passed over or missed were.

In variety the Toliganj flies were disappointing, but, besides the above named, they included a very fine female *Ixias pyrene*, the sole Orange-tip seen at Calcutta; a few *Catopsilia pyranthe*; several *Ergolis ariadne*; *Elymnias undularis*, not common; plenty of that very distinct Blue, *Neopithecops zalmora*; a single specimen of *Loxura atymnus*, and plenty of *Ypthima hübneri*, *Y. marshalli*, *Y. philomela* and *Nychitona xiphia*.

The list is closed by "*Melanitis ismene*, lover of darkness, as its name seems to say. It flitted about everywhere dressed in all the tints of fallen leaves, or, alighting among them, fell partly on one side and was one of them."* I quote the words of E. H. A., that keen observer and telling writer. The few specimens that I saw that day were very dark and of the "dry season" form. A note made at the time says: "This shade-loving species, which only flies for a *very* short distance and settles on the ground, has a 'list' to the right of 20-30°, making it very like a dead leaf."

A parasitic bee, *Crocisa histrio*, Fab., was caught feeding on the wing like a Sphinx.

On December 8th, I visited the grand Botanic Gardens at Howrah, but it was too late in the day for many butterflies to be about. I noted, however, *Lampides celeno*, Cr.; *Mycalesis indistans*, Moore, a *Delias* and two or three *Terias*. Late in the afternoon, just before leaving the gardens, I noticed a few *Limnas genutia* fluttering about a palm-tree prior to settling down for the night. On looking carefully I noted on one of the huge leaf-stalks, some twelve or fourteen feet from the ground, a *cluster* of the butterflies *hanging together like swarming bees*. By pelting with sticks and stones the cluster was broken up and proved to consist of at least seven or eight individuals. Altogether there were perhaps twenty in and about that tree. This certainly establishes for *L. genutia* the character of gregariousness. Both Mr. S. E. Peal and Mr. F. Möller told me that they had never seen such a thing.

Darjiling, 27° N., alt. 7000 ft.

December 13th—22nd, 1903.

I set off to this celebrated hunting-ground with great

* "A Naturalist on the Prowl," p. 203.

misgivings as to season, but still full of wild hopes. The ascent by the cog-wheel railway took us through a most interesting forest, where amongst other things we saw our first tree-ferns. Near Tindaria, at about 3000 feet, I saw several *Ixias pyrene* and succeeded in catching one from the train while it was going at full speed—about seven miles an hour! This was a male of the large form *evippe*, Drury.

Before reaching Kurseong, nearly 5000 feet, where I had arranged to sleep with a view to getting a little collecting, we got into the clouds, and at our destination it was very cold, with an atmosphere only too like that of the West of Scotland. During a gleam of sunshine I took a *Vanessa kashmirensis*, a poor dull thing compared to our *urticæ*. At night two moths, an Acidaliid, *Synegiodes hyriaria*, Walk., and *Caradrina albosignata*, Oberth. (thought by Sir G. Hampson to be probably identical with *lineosa*, Moore), came to light.

The following morning was brighter and we started early to walk up to the next station, Toong, but though the weather was more benignant, the railway ran through a district devoted to tea-growing which did not promise well. A few *Vanessa kashmirensis*, a *Pyrameis indica* and a *P. cardui* flew along the road, the latter with both apices of the fore-wings and one hind-wing near the anal angle apparently bitten. Near Toong station, 5500 feet, in a sheltered and flowery spot I took single specimens of the Hairstreaks *Ilerda epicles*, Godart, a female, and *Camena cleobis*, Godart; the latter on the upper surface like *T. quercus*, but bluer, on the under-side almost white with a practically black spot on the anal lobe. Here also I took a male *Hiposcritia lalage*, Dbl., and a native caught in his fingers a *Dodona eugenes*, Bates (an Erycinid), and the same man brought me a fine Saturnid moth, *Rhodia newarra*, Moore, 6½ inches in expanse, apparently recently dead.

As the train rounded the last corner we came in full view of the Kangchinjunga range, rising majestically full four miles above us. No words can describe the grandeur of the scene and we were fortunate indeed in having it clear throughout our stay. Yet, entomologically speaking, it was the saddest of disappointments, for it was as cold as England in November and the local entomologists—Messrs. Möller and Lindgren—assured me that *Kallima* was hopelessly over, as indeed were most things. They, and every one we met, spoke of the astonishing multitudes of

butterflies in the rainy season ; the harder it rained, they said, the more insects there were in the short interludes between the showers.

On the high ground I got little ; *Vanessa kashmirensis*, *Pyrameis indica* and *cardui*, none of them common, also a brilliantly-coloured beetle, a species of *Cassida*. I saw a school-boy catch *Colias fieldii* and a tailed "blue." At Jalapahar, 7500 feet, I got a female *Huphina nadina*, Luc. [= *remba*, Moore].

The only chance was to go down into the valleys, but it takes long to descend, and as the butterflies are for the most part only "at home" from 10.0 a.m. to 2.0 p.m., one does not get many hours' collecting ; moreover, from those precious hours there are deductions to be made for cloudy times, and for the shadows of woods, and the still deeper shadows of lofty mountains.

My first expedition, lasting three days on horseback, was to the Tista valley, lying to the east of Darjiling. December 17th, we went to Pashók, about 17 miles, sleeping at the Public Works Department rest-house, about 2300 feet above the river, and about 3000 feet above the sea.

When we got down to about 4000 feet above sea-level insects began to get fairly numerous, although it was late in the day for butterflies. *Vanessa kashmirensis* was common, and with them were several *Pyrameis indica*. I secured two of the handsome White *Hiposcritia lalage* [= *argyridana*, Butl.], both females. Several *Neptis astola*, Moore, were seen, mostly worn. At a shady turn of the road I got *Lethe rohria*, F., an *xgeria*-like Satyrid butterfly ; close by *Arhopala areste*, Hew., flashed azure in the sunlight, but a specimen of another beautiful Lyncæid, *Spindasis vulcanus*, F., was badly battered. Of *Abisara flegyas*, Cr., and *A. fylla*, Doub., I netted one each, and a large bee, *Bombus funerarius* ?, Smith, a ♂, tempted me to catch him.

In the wood in which the rest-house stands *Mycalesis indistans*, Moore, was in abundance ; this is a typical shade-lover ; when kicked up from the herbage it flaps about three yards, like *Epinephale janira*, L., and then settles on dead leaves or on the earth. Some of them had a slight "list," but this did not seem to be a marked habit, possibly because this position is not so advantageous in shade as in sunlight, though the habit was first noticed in *Melanitis*,

a typical shade-loving genus. The existence of shade-loving butterflies would seem to be correlated to a tropical sun, but even in England *P. ægeria* and *E. hyperanthus*, L., still more *L. sinapis*, are what I should term "partial shade-lovers."

In the same wood, also in the shade, *Terias læta* and *T. hecabe* were both common, and in sunnier glades the common Indian Blue, *Lampides celeno*, Cr., was both abundant and gregarious. In a young cinchona plantation close by I found *Ganoris canidia*; a Blue, *Cyaniris puspa*, Horsf.; and a handsome very large Skipper, *Celænorhinus leucocera*, Koll. In the rest-house there was a dead Pyrale, *Lepyrodes geometralis*, Guen.

The next day, December 18th, I sent my pony on ahead, and walked down to the river collecting on the way. In the cinchona plantation close to the rest-house I found *Zemeros flegyas*; lower down were *Euthalia appiades*, Mén., of which I saw several worn specimens; a Hairstreak, *Archopala bazalus*, Hew., like a glorified *T. quercus*; *Lethe verma*, Koll.; and *Melanitis ismene*, the last as usual a shade-lover.

A path leading off through the wood brought me to a tea-garden, perhaps 1500 feet above sea-level, where I lingered all too long. Tea-gardens are not as a rule good places for butterflies, and the flower of the tea-plant, then just coming out, does not appear to have attractions for them, but this particular garden, just at the edge of the forest, and especially that corner of it where the little stream runs in, was certainly very prolific.

Athyma ranga was in abundance, though worn; likewise its relatives of the genus *Neptis*, but the three specimens that I sent home belonged to as many species: *N. aceris*, Cramer; *N. astola*, Moore; and *N. varmona*, Moore; the closely allied, but brown and black, *Symbrenthia hyppoclus*, Cr., was almost as common among the tea-bushes. Of the satin-winged *Hiposcirtia indra*, Moore, I took two females. Of the following I got single examples only:—*Caduga melaneus*, Cr., and the very similar *Parantica melanoides*, Moore, two black and white Danaids; *Athyma selenophora*, Koll.; *Yphthima philomela*, Joh.; *Archopala centaurus*, Fab.; and *Castalius anaura*, De Nicév., ♀, while another Blue, *Lampides clpis*, Godt., pale and beautifully sheeny, was common. I also missed what was, I believe, *Libythea rama*, Moore. There were in

addition two moths, an Arctiid, *Leucoma submarginata*, Walk., and a Nyctemerid, the fuscous-and-white *Zonosoma cenis*, Cram. (= *interlectum*, Walk.), the former possibly, the latter certainly a day-flyer.

At last I dragged myself away and an hour later reached a most attractive flowery bank immediately above the river. This was evidently a great place, for in a very short time I secured two sadly battered *Papilio memnon*, L., of the form *agenor*, L.; a large male *Ixias pyrene* with the forewings almost symmetrically bitten near the tip of the costa; also an insect that I had greatly desired to take, the lovely and delicate-looking "map-butterfly," *Cyrestis thyodamas*, Bdv., in splendid condition. This, a Nymphalid, by the possession of a well-marked anal lobe to the hind-wing suggested the *Rapala* group of Lycænids, but a close examination of the veins shows that neither lobe nor tail is homologous in the two widely separated genera. In addition to the above I took a second *Caduga tytia*, Gray, the first having been netted 1000 feet higher. This blue-and-black Danaid is distinguished by having brown hind-wings. Time was however getting on and my "sais" was waiting with the pony by the little bridge, so I reluctantly mounted. I had not ridden far when I caught a glimpse of *Kallima inachis*, Bdv., flying by the roadside; flinging myself out of the saddle I was fortunate in netting the butterfly of all others that I had wished to see alive. It proved to be a fine female; I could not afford to risk waiting to see her settle, and alas! never saw another. A few minutes later my sais brought me a damaged *Euplexas* with a lovely purple gloss; seeing many about I foolishly did not keep it. These things happened close to the Tista bridge, by which the road to Lhasa crosses the river, here only some 650 feet above the sea, so deeply are these Himalayan valleys cut down. Sad to say in a few minutes the winding of the road took me under the deep chill shadow of the mountain and the purple-glossed *Euplexas* and nearly all the other butterflies vanished for that day. A solitary *Neptis accris*, Cr., together with a few *Ixias pyrene*, *Huphina nerissa* and *Lampides elpis*, were all that I saw; with them was a Nyctemerid day-flying moth, *Trypheromera plagifera*, Wk.

The rest-house at Riang was reached too late for any more collecting, and I had to content myself with watching the long trains of Colonel Younghusband's bullock wagons painfully dragging loads of compressed hay for the Tibetan

expedition. Alas for the once fair road, now a foot deep in white dust!

December 19th. *From Riang by way of Mongpu and Sareil back to Darjiling.* This was such a long march that little time could be given to collecting, moreover many hours were spent passing along a beautiful forest track in the deep afternoon shadow of the mountain. At the start, close to the river, the silvery-white *Acropteris vagata*, Moore, was conspicuously spread out upon a leaf, this was the only Uraniid that I met with. Near Mongpu, at about 3000 feet, *Ergolis merione* was very common about *Ricinus*, the castor-oil plant, upon which its larva feeds. A little higher up I came across *Ticherra acte*, Moore, a *Lycænid* with very long tails that wave with the wind; it has a swift jerky flight. The hind-wing of this species is much plaited but the anal lobe is rudimentary.

Other captures were *Huphina nerissa*, a male; *Ganoris canidia*, a female with all the hind margin of the hind-wing gone; *Tachyris hippo*, Cr., a male; *Arhopala rama*, Koll.; *Neptis astola*, Moore; *Perda epicles*, Godart, with all the hinder part of the secondary apparently bitten off by a lizard; *Cirrochroa aoris*, Dbl., which I had seen at Pashók on the previous day; *Lethe rohria*, very like *P. ægeria* in its habits and liking for partial shade; and *Argynnis niphe*, this last in the cinchona plantation at about 3600 feet. A large white butterfly, bright yellow underneath, fluttering at the sweet white flower of the cinchona led me to dismount, and it was well that I did so, for it turned out to be *Prioneris thestylis*, Dbl., and fortunately a female, which must be very much the less common sex, at any rate the Hope Collection contained no female of the genus.

The next day, December 20th, I rode down to the Ranjit River, the boundary of Sikkim, the great *Papilio* country. Distance however reduced my actual collecting to less than four hours.

At about 3000 feet I took two of the Erycinid *Zemeros flegyas*, also *Symbrenthia hyppoclus*. The chief collecting-ground was near the suspension bridge leading into Independent Sikkim, closed this year to all Europeans, including entomologists, on account of the Tibetan difficulty. It was trying to one's European temper to be stopped by a coloured policeman, while natives passed freely over!

Here, some 8000 feet above the sea, the first thing that I happened upon was *Limnas chrysippus* in extreme

abundance in a very limited locality, it was in fact decidedly gregarious. By the way, pinching and cyanide are both but very imperfect ways of slaying these tough-skinned Danaiids.

Elymnias undularis, both sexes, was common, but I did not see any *L. genutia* for its female to mimic; although the under-side of this butterfly is "leaf-like," it is, as a fact, usually conspicuous when settled.

I caught distant glimpses of two *Papilios* and I missed my first *Hebomoia*, in fact the things that I missed that day would have made quite a good collection!

The following were all common: *Huphina nadina* and *H. nerissa*, both males; *Ixias pyrene*, large; *Neptis accris*, Cr.; *Precis iphita*, spreading out like a *Eupithecia* when settled; *Symbrenthia hypocoelus*, and *Lampides celeno*, Cr., while *Terias hecabe* was very abundant and large.

Other things taken were *Ypthima marshalli* and *Mycalesis rineka*, Moore, this last a very dingy species. In marked contrast was *Jamides bochus*, Cr., the male iridescent dark-blue above, quite gem-like, beneath dull grey with a metallic ocellus at the anal angle of the hind-wing; the female comparatively dull in colour.

For some reason I that day missed a larger proportion than usual but managed to catch the following:—*Prioneris thestylis*, a male; *Cirrochroa aoris*, looking on the wing like a big *Argynnis*, but settling with wings half-expanded, several seen, but only one netted; a *Charaxes athamas* taken on a flower was the only individual of the genus that I got in all my travels. Another specimen of this very distinct and beautiful species was soon after seen feeding upon human ordure! Fear of fouling my net prevented me from striking down upon it, and it suddenly darted up, went twice round with a swift jerky flight and then disappeared. Mr. Möller had indeed told me that *Charaxes* was a very foul feeder.

The elegant day-flying moth *Trypheromera plagifera*, Walk., must be added to my list, as well as the little Geometer *Psilocambogia memorata*, Walk., which I found dead, caught and set out upon a burr (of some composite flower). Lastly a beetle, *Mimela horsfieldi*, Hope, of brilliant green with coppery tinge.

The extraordinary abundance of dragon-flies of many kinds at the Ranjit River was remarkable, yet I did not once see a butterfly attacked by any of them.

I left Darjiling on December 22nd, with much regret, and a strong desire to return at a better time of the year. On the way down, at about 4000 feet, *Irias pyrene* was common, while close to Tindaria station, at about 2900 feet, I netted from the train a pale Blue with a whitish patch on each wing, *Cyaniris dilectus*, Moore, as well as another Blue, *Cyaniris ladon*, Cr., form *pseudargiolus*, Boisd., and an Acidaliid, *Idæa remotata*, Guen.

At Tindaria I left the train and walked down to Sukna. The following things were met with: (1) At altitudes of from 2800 feet to 2000 feet:—

The Erycinid, *Zemeros flegyas*, Cram., almost abundant, but rather worn; *Mycalesis indistans*, Moore; *Precis lemonias*, a small specimen in fine condition, also large ones worn [this and *P. iphita* were the only species of the genus met with in the Darjiling district]; single examples of *Neptis aceris*, *N. astola* and *N. varmona*; *Symbrenthia hyppoclus*, common; *Lampides celeno*, Cr., form *aleris*, Stoll., also common; *Ganoris canidia*, a female; *Huphina nadina*, a male, about 3000 feet; *H. nerissa*, a male, about 2500 feet; *Tachyris hippo*, a very fine female; *Terias hecabe*, abundant, two males, one of them dwarfed, were of the variety without the “dog’s head.”

(2) At altitudes of 2000 feet to 1500 feet:—Here I took *Catopsilia pyranthe*, a male; *Ypthima marshalli*, two; *Huphina nerissa*, worn males were common; *Precis lemonias*, several; *Terias libythea*, common; and the Blue, *Zizera otis*, Fab.

At about 3.30 p.m., I watched a fine specimen of *Papilio aristolochiæ* flying very slowly about herbage, apparently seeking for a resting-place for the night, just as I had seen *P. pammon* doing at Kháirna on November 18th; near the same place I missed two specimens of a black-and-white Danaid.

(3) A little way above Sukna, perhaps at about 700 feet above sea-level *Orsotriana* [*Mycalesis*] *runeka*, Moore, was in the greatest abundance in a deeply-shaded wood; this, a typical shade-lover, is sluggish but is on the move later than most things (for it was just before sundown), but when kicked up from ferns or other low herbage it did not fly more than two or three yards. It varies greatly in the pale streak on the under-side which may be white and very conspicuous or almost obsolete. One specimen exhibits a well-marked bite on the hind margin of both hind-wings

above the anal angle, the injuries on both sides corresponding closely.

It was dark when I reached Sukna station, 500 feet above sea-level, and fireflies, *Luciola* sp., were flitting about on all sides. A "flare" lighted just before the arrival of the train attracted many moths, of which I secured a large sharp-winged transparent Pyrale, *Cydalima conchylalis*, Guen.; and the Noctua, *Prodenia littoralis*, Bdv. In the train, immediately after starting I bottled a strange-looking ♂ winged ant, *Dorylus juvenculus*, Shuck.

Thus closed my short Darjiling campaign, and leaving behind with much regret the awe-inspiring Himálaya, we steamed away into the darkness over the monotonous plain of Bengal.

Bankápur, lat. 25° 30' N., alt. c. 250 ft.

December 22nd, 1903—January 3rd, 1904.

In absolute contrast to Darjiling, Bankápur, the civil station of the great city of Patna, is situated on the level, monotonous, and highly-cultivated plain of the Ganges, affording little harbour for butterflies, so that a fortnight's stay with old friends at the hospitable parsonage yielded small entomological results.

In spite of these unpromising surroundings, *Limnas chrysippus* was common, and in company with it *Hypolimnas misippus*, of which I saw several males and secured one female, which latter so closely mimics the former species that even the small white spots on the thorax and head are reproduced!

Of *Tirumala limniace* I saw a solitary example, of *Crastia core*, two; but the other very common Danaid, *Limnas genutia*, was abundant in a mango orchard, and distinctly gregarious in its habits. It has rather an unpleasant scent, but whether or no it is confined to one sex I regret that I failed to notice.

The Satyrids were represented by a solitary *Mycalopsis perseus*; the Swallow-tails by *Papilio pammon*, worn, *P. aristolochiæ*, and *P. erithoniüs*, the last a flower-loving species. *Precis* was represented by four species: *almana*, one of them with large pieces, in part corresponding, bitten out of each hind-wing; *cenone*, one; *lemonias*, several; and *orithyia*, several, the latter all small. Single specimens of the common and generally distributed *Atella phalanta* and

Ergolis merione were seen in gardens. A fine *Limenitis procris* was taken sipping "toddy" from a palm; I missed him at the first shot, but he foolishly returned to his fatal liquor.

Of *Catopsilia pyranthe* I took two males and a female. I held one of the former fluttering beneath my nostrils, when it gave out a strong scent that instantly brought greenhouses to my mind, then my own greenhouse, then *Polianthes tuberosa* (barbarously termed by nurserymen "tuberoſe"), and lastly jasmine. I do not think that I ever smelt so distinct a scent in a butterfly, always excepting the male of *Ganoris napi*. The other male *pyranthe* I held under my nose while I stroked the "feather-tufts" of the hind-wing; this at once elicited the odour of jasmine, further confirming the observation of Wood-Mason.

Two males of *Huphina nerissa* bear the following notes: "Scented, not like *napi*, more like *rapæ*," and "this specimen had a scent like *P. rapæ*, i. e., of the sweet-briar type." Again a female of *Delias eucharis* (which was common) bears the note, "has a scent much like *rapæ*," and the specimen appears to have been wilfully rubbed. My observations on butterflies in England show that in some cases females have a scent, but not like, or as strong as the males. My strong impression is that the male of *D. eucharis* has the *rapæ*, or sweet-briar scent.

The three species of *Terias*, viz. *hecabe*, *libythea*, and *læta*, were all common; one of the *læta* appears to have been bitten by a bird.

Nychitona xiphia was not uncommon, and several *Ixias marianne* were seen. *Chilades varunana*, Moore (according to De Nicéville the wet-season form of *C. laius*, Cr.), was common about irrigated flower-beds, indeed Blues are wonderfully fond of water. The only butterfly seen at Bankápúr that was at all out of the common, besides *Limenitis procris*, was the large grey Lycænid *Virachola isocrates*, Fab., of which I took one at flowers in the Commissioner's garden. I noted that its hind-wings were much folded posterior to the tails, the convexities of the folds being towards the upper-surface. These foldings of the wings are not well seen in set specimens.

Although Bankápúr is far from being a good locality, it will give some idea of the abundance of butterflies in India when I say that in mid-winter, December 24th, I took in a suburban garden within three-quarters of an hour no less

than ten species, some of them represented by numerous individuals.

Buddha Gáya, lat. $24^{\circ} 42' N.$, alt. c. 500 ft.

December 30th and 31st, 1903.

The vicinity of the shrine and its sacred Bo tree was not productive. All the butterflies that I saw there were one *Terias libythea*, a number of *Huphina nerissa* (the male yielding a distinct, but not strong, flowery scent), together with a lot of the Lycaenid *Zizera karsandra*, Moore.

The next day, on a steep hill of red trap rock overlooking the town, I saw for the first time the Acraeid *Telchinia violæ*, reminding one on the wing of *Argynnis euphrosyne*; it was locally abundant and gregarious, its tone of colouring harmonizing with the red igneous rock. On the same hill were two or three *Precis ænone* and several small *P. orithyia*, while *Zizera otis*, Fab., was abundant.

In the course of this walk I noticed a Fakir, or religious mendicant ascetic, watching my operations with evident suspicion, probably owing to the reverence in which some of these folk hold all animal life. Presently a small native boy threw a stone at a squirrel. I thought better of the Fakir when he cursed the boy so fiercely that he fled in terror as fast as the squirrel, while I rolled up my umbrella-net and passed on, trying to elude observation!

Mozufferpúr, lat. $28^{\circ} 8' N.$, alt. c. 300 ft.

On a flying visit, January 2nd, 1904, to this place, nearly north of Bankápúr, I took in my host's garden two *Zizera otis*, Fab., and one *Zizera maha*, Koll.

Allahabád, lat. $25^{\circ} 30' N.$, alt. 370 ft.

Here on January 4th I saw a few of the very commonest Indian butterflies in the public garden. The railway carriage before leaving in the evening produced a grasshopper, *Atractomorpha* (*Perena*) sp., and *Prodenia littoralis*, a Noctua that came to light. This last proved tenacious of life, it laid a number of eggs in its paper which hatched on the voyage, the young larvæ perishing miserably.

Jhānsi, lat. $25^{\circ} 30' N.$, alt. c. 750 ft.

January 5th—13th, also 21st, 1904.

Situated on a sandy plain, broken by precipitous ridges of igneous rock, Jhānsi, something like 750 ft. above the sea, is characterized by dryness, heat, and sparsity of cover.

A couple of *Papilio aristolochiæ* taken at flowers near the lake were the sole representatives of their family.

Several *Belenois mesentina* were taken, but it was scarcely common; the male had a distinct but faint, sweet scent; on the ridge of Retribution Hill (where Sir Hugh Rose in 1858 slew 2000 mutineers), I took a female *B. mesentina* in which the hind-margins of the secondaries had been symmetrically broken off, probably by the bite of a lizard. Of three specimens of *Terias hecabe*, one, a small female, was of the variety without the "dog's head" notch. Of *T. libythea* a single specimen was taken, but *T. læta* was common and of gregarious habits. *Teracolus etrida* was locally rather common, especially the female. On the other hand, the male of *Ixias marianne* was rather common.

Two *Atella phalanta* were taken; the only *Prexis* noted was *orithyia*, and that very dwarfed, one measuring only 1.4 inches across the wings.

Telchinia violæ was abundant at the foot of Retribution Hill, and scattered specimens occurred elsewhere. This insect, like the Danaïds, has a tough skin which enables it to resist pinching, and doubtless makes it indigestible. When injured a yellow juice exudes; a minute drop of this placed on the tongue tasted somewhat bitter and disagreeable, but the flavour was by no means strong.

The Jhānsi Lycænids were fairly numerous, but not very brilliant, the most striking was *Chilades putli*, Koll., actually smaller and darker than our *alsus*; other species were *Chilades laius*, Cr., which appears to have been common, but of which I unfortunately took but one specimen, and *Catochrysops contracta*, Butl., of which I took two; *Turucus theophrastus*, Fab., of which the two sexes are, on the upper surface at least, very different, was common, but of *T. telicanus*, Lang, I only secured one of each sex, though noting it as common. Blues are very abundant in India, but they are very much alike, so that being ignorant of the distinctions between allied species, one was but too apt to neglect them while in the eager

pursuit of larger game. For these reasons too much weight should not be attached to the observation that such and such a species was common or abundant, but the qualification, "or something superficially like it," should be added.

Two moths came to light, an Agrotid *Euxoa spinifera*, Hübn., and the *Macaria*-like *Semiorthisa frugaliata*, Guen. I also took a brown beetle, *Bolboceras quadridens*, Fab.

After prolonged drought there was a heavy rainstorm at Jhānsi on January 14th, and there was slight rain at Gwālior on the 16th and 17th. With the exception of a *very* few days when there had been clouds and occasionally a *few drops* of rain, there had been almost uninterrupted sunshine for three months, *i. e.* since October 8th. On January 20th, writing to Dr. Dixey, I said, "There has been a very cold 'wave' in Northern India with a few showers of rain, but scarcely enough of the latter to affect either vegetation or insects." On January 23rd there was gentle rain at Jhānsi lasting several hours.

On January 21st I had another day's collecting at Jhānsi, but the species taken were not such as to show any effect in the way of change of type due to the rain, even if such change had been possible. The insects met with were *B. mesentina*, *I. marianne*, *T. ctrida*, *A. phalanta*, and *Tarucus theophrastus*.

Orcha.

On January 9th I had an hour's collecting in this interesting deserted city, some eight miles to the east of Jhānsi, and took or saw *Limnas genutia*, *Precis lemonias*, *P. anone*, and *P. orithyia* (this last in abundance), *Atella phalanta*, an *Ixias*, *Teracolus ctrida*, a *Terias*, and several female *Belenois mesentina*. Monkeys were almost as common as butterflies among the ruined tombs.

Burwa Sāgar.

On January 14th I got a couple of hours' collecting in the neighbourhood of the interesting and romantically-situated old castle of this name, which lies some twelve miles to the east of Jhānsi.

Here I observed in two specimens of *Limnas chrysippus* (of which certainly one was a male) a distinct cockroach-like odour, sufficiently strong to be perceptible when the

insect was fluttering in the net. Of *Catopsilia pyranthe* I took a female of the *gnoma* form; of *Terias hecabe* a male, the variety without the "dog's head" mark. *T. læta* was quite abundant. Two specimens of *Huphina nerissa* were taken, one worn, the other a dwarf. The male of *Belenois mesentina* was common, in two specimens I detected a sweet scent like that of *P. rapæ*, but more or less faint. A *Polyommatus bæticus* completes the list.

Agra, lat. 27° N., alt. 550 ft.

January 25th and 26th, 1904.

At the sight-seeing centre of India there was but little time or opportunity for entomology. In the fair gardens of the Taj Mahal *Limnas chrysippus* was abundant, three or four *Papilio aristolochiæ* haunted the brilliant orange-coloured flowers of *Bignonia venusta*, and a few *Belenois mesentina* were flying around. In the Government garden close by I also saw the *Belenois*, together with *Huphina nerissa*, *Precis orithyia*, and *P. lemonias*, *Limnas chrysippus*, and *L. genutia*, also a *Teracolus*, and some Blues which escaped capture.

Fathipur Sikri.

January 28th and 29th, 1904.

At the abandoned capital of Akbar the Great, the Pompeii of India, some twenty-two miles west of Agra, those ruin-frequenting butterflies, *Belenois mesentina* and *Teracolus ectrida*, were both common, but all appeared to be males. The *Belenois* had a faint, sweet, flowery scent, which did not appear to me to be quite like that of any other insect.

I also took one *Teracolus puellaris*, a female, and a most ferocious hornet, *Eumenes dimidiatipennis*, Sauss., a ♀.

Jáipur, lat. 27° N., alt. 1600 ft.

February 2nd, 1904.

The fine public gardens of the enlightened Máharajah are too well kept to be a good collecting-ground. *Terias læta* was however to be had there [as well as at the deserted capital Ambér, a few miles to the north and on higher ground]; those taken were males; a very small

Limnas chrysippus seemed to bear evidence of the prolonged drought. The genus *Papilio* was represented by *aristolochiæ*, and the Chrysid *Stilbum splendidum*, Fab., did its best to gratify the Rájpúts' love of brilliant colour.

Ajmir, lat. $26^{\circ} 30'$ N., alt. c. 1800 ft.

February 4th and 5th, 1904.

The most notable capture here was *Teracolus fausta*, Oliv., of which I only got one male, a poor specimen, missing two others; it has a very distinct orange look on the wing, and I feel sure that I saw one on January 22nd at Pálipahári, the artillery camp near Jhánsi.

Of *T. etrida* I took two males, one of them had lost the apex of the left fore-wing and all its hind-margin, as well as the apex of the left hind-wing. This is notable as possibly being an attack on a "direction mark."

I saw several battered *Precis ænone*. The smaller fry were represented by a very neat little chequered Skipper, *Hesperia galba*, Fab. The emerald-like *Stilbum splendidum* again turned up.

On Taragarh, the precipitous hill that overtops the city by perhaps 500 ft., I got only *Belenois mesentina*, *Terias læta*, and the long-waisted ♀ wasp, *Eumenes dimidiatipennis*, Sauss.

Mt. Abu, lat. $24^{\circ} 30'$ N., alt. of civil and military station c. 4100 ft.

February 6th—8th, 1904.

Insects were extremely scarce upon the sacred Jaina mountain. The commonest butterfly was *Terias læta*; it was abundant up to 4500 ft., and the only representative of the genus seen. These, together with *Belenois mesentina*, *Huphina nerissa*, a few *Precis lemonias*, and a couple of *tages*-like Skippers (which I missed upon rocks at about 4400 ft), were the only butterflies that I saw on the elevated plateau. One moth, the very widely-distributed *Crambus*, *Eromene ocella*, Haw., came to light.

At lower elevations, on the fine road up from the plain, the following were met with: at about 3000 ft., *Belenois mesentina*, *Taracus telicanus*, and *Polyommatus bæticus*, the last as usual in poor condition. From 3500 ft. down to

2500 ft. a few *Ypthima inica*, Hew., were seen, and at about the last-named elevation, among the rocks of a nearly dry water-course, I saw two specimens of the beautiful Nymphalid, *Symphædra thyelia*, Fab., but only secured one. It has the habits of a *Vanessa*; unfortunately time was pressing, or I might probably have taken more.

Bombay, lat. 19° N., near sea-level.

February 10th, 1904.

In an hour's visit to the Victoria Gardens, where there were a fair number of insects, I got *Papilio erithonius*, *P. aristolochiæ*, *Neptis varmona*, and *Nepheronia hippia*, a female, the last named mimicking *Tirumala*.

On February 15th I was much interested in watching the movements of a solitary butterfly in the small public garden of the University, in the heart of the city. It appeared to be a large *Catopsilia*, possibly the *catilla* form of *pomona*, but at any rate of a general greenish-yellow colour; when disturbed it invariably settled in one or other of several small shrubs with yellow leaves, when it would vanish quite suddenly. It was only after several attempts that I succeeded in getting a glimpse of it when settled, so strong was the protective resemblance.

Bijápûr, lat. 17° N., alt. c. 1500 ft.

February 16th and 17th, 1904.

This was further south than I had yet collected, but the scanty vegetation among the ruins seemed too parched to yield very much. The most prevalent genera here, as at so many places where thorns, burrs, rocks and ruins predominated, were *Belenois* and *Teracolus*, the last a genus which, though beautiful in the cabinet, is not effective on the wing.

Teracolus etrula was abundant, the males appearing to be about twice as numerous as the females; they varied greatly in size, so much so that among the males the largest had nearly double the alar expansion of the smallest. Of *T. dulcis* I took one female, and of *T. amatus*, var. *modestus*, two males.

The only *Terias* seen was *læta*. *Belenois mesentina* was abundant; a slight sweet scent was detected in one specimen.

Catochrysops strabo, Fab., was common, also *Polyommatus bæticus*, one specimen having lost two-thirds of each hind-wing, presumably the work of some enemy; of *Zizera karsandra*, Moore, I took one.

At night several moths came to light, viz. the *Ocneriad*, *Enome detersa*, Walk., the Geometers, *Tephrosia disputaria*, Guen., and *Idæa fibulata*? Guen. (worn), and the very widely-distributed *Etiella zinckenella*, Treit.

A ferocious-looking spider, a *Solpuga*, shared the Dāk Bungla with us.

Anantāpūr, lat. 14° 30' N., alt. c. 1500 ft.

February 18th—23rd, 1904.

This small civil station, situated on an irrigated though elevated plain devoted to the growing of cotton and rice, is typical of Southern India.

A very hot walk to some small granite hills on the other side of the lake produced little beside two males of *Ixias marianne*, and a solitary *Teracolus eucharis*; the hills seemed too hot, dry, and parched to harbour butterflies.

About the trees along the dam, or "bāndh," were a few *Hypolimnas misippus*, males, and abundance of *Papilio aristolochiæ*.

In the cotton fields by the river *Hypanis* [*Biblia*] *ilithyia*, Dru., was to be got, but not plentifully.

The best collecting-ground was a very weedy nursery garden and orchard. Here I one day had the advantage of the assistance of my host, Mr. Edwin Scott, I.C.S., whose keen appreciation of scents helped me greatly. *Limnas chrysippus* was abundant; of its scent Mr. Scott's first impression was "some sort of dung," then "a zoo"; later he said "possibly like a cockroach, but more like a musk-rat." The scent is, I think, general, but is perhaps stronger when the scent sacs on the hind-wings are opened: a fact that I also observed at Calcutta.

Crastia core was common and gregarious, frequenting a special mango-tree. When he smelt this insect Mr. Scott at once cried out "acetylene," adding that he would like to put a lighted match to it to see whether it would burn! Subsequent observations on the butterfly and the gas convinced me of the accuracy of his comparison. The genital organs appear to exude the scent, probably the long tufts appended to them.

At this place I confirmed in two specimens of *Catopsilia pyranthe* the jasmine odour connected with the "scent tufts" of the male, but did not find it as strong as in specimens of the same species examined at Bankápur six weeks before. Mr. Scott agreed to the comparison with jasmine, but thought the scent was perhaps even more like that of *Polianthes tuberosa*.

I also examined two males of *Tirumala limniace* for scent, but was unable to elicit any from the prominent sacs on the under-side of the hind-wings, although I suspected some to be emitted by the genital tufts.

Papilio erithonius was frequently met with, and *P. aristolochiæ* was common, but I only took a single *P. pammon*. Although the male of *Hypolimnas misippus* was fairly common, I only saw one worn female; this was of the very marked variety *inaria*, Cramer, in which the white marks near the apex of the fore-wing are entirely wanting, and the black tip is reduced to a narrow border, so that it closely mimics *L. chrysippus*, var. *dorippus*, Klug., a form that is very rare in India. I several times saw the male *H. misippus* reconnoitring *L. chrysippus* as if in doubt as to its identity!

Of *Precis ænone* I took but one, of *P. almana* two, but *P. lemonias* was common. Of the following species I took mostly single examples:—*Limnas genutia*; *Ergolis ariadne*; *Neptis varmona*; *Polyommatus baticus*; *Lampides celeno*, Cr., form *conferanda*, Butl.; *Catochrysops hapalina*, Butl., two; *C. strabo*, Fab.; *Zizera otis*, var. *indica*, Murray, two; and the Skipper, *Suastus gremius*, Fab.

Of *Melanitis ismene* I took but a small fraction, for one seldom sees a butterfly so battered, yet even this fraction was found in the shade. In marked contrast are the habits of *Telchinia violæ*, since it haunts the most sun-scorched places; it was not uncommon at Anantápur, but if gregarious, as elsewhere, then I did not hit upon its head-quarters.

I took one *Terias libythea*, and saw several *T. hecabe*, though it was but moderately common.

Hovering at flowers I two or three times saw, and once caught, *Cephanodes hylas*, L., an insect very like *Sesia bombyliiformis*, Esp. There were also flying in the sun *Deiopeia pulchella* and *Trigonodes hyppasia*, Cr., a *Noctua* very like *Hydrelia unca*, L., which reminded me of Headington and old Oxford days.

Out of the grass I kicked up *Tephрина catalaunaria*, Guen., a pretty little Macariid Geometer *Semiothisa subalbipartita*, Swinhoe, and *Sterrha paullula*, Swinhoe. The common dragon-fly, *Orthetrum sabina*, Dru., and a bug, *Eysarocoris guttiger*, Thunb., completed the tenants of the garden.

A number of things came to light, viz.:—*Dciopeia pulchella*, the Ocneriad, *Enome detersa*, Walk., a Noctua, *Ericcia inangulata*, Guen., a Pyrale, *Schenobius bipunctifera*, Walk., and a tiny Quadrid Noctua *Raparna lactea*, Swinhoe, as well as two bugs, *Acanthaspis apicata*, Dist., and *Dieuches uniguttatus*, Thunb., the former apparently a scarce insect since the national collection contains the type only. There was in addition to these a small ochreous narrow-winged Geometer to which I have not been able to assign a name, and an ichneumon, *Henicospilus*, sp. In fact one evening swarms of insects came to light, including many mosquitos, but these appeared to be all *Culex*, fortunately no *Anopheles*.

Bangalūr, lat. 13° N., alt. 3100 ft.

February 23rd, 1904.

The change of trains at this large military station gave me an hour or two's collecting in the extensive public gardens. There was rather a high wind which was against a good day, but the afternoon proved interesting since it gave me the first glimpse at the "Ceylon" fauna. Here I saw for the first time that very striking black, white, and orange Lycænid, *Talicada nyseus*, Gûer., as well as the huge and magnificent *Papilio polymnestor*, Cram. [*parinda*, Moore], a truly gorgeous monster in which a pale lilac is the prevailing colour trimmed with black.

The only other things noted were more ordinary, to wit *Catopsilia pomona*, a female, *Crastia core*, several *Telchinia violæ*, *Nyctitona xiphia*, an abundance of *Neptis varmona*, and one *Neptis jumba*, Moore.

The Nilgiris, lat. 11° N.

February 24th—March 3rd, 1904.

The Nilgiris, or Blue Mountains, rising abruptly from the plain, itself nearly 2000 ft. above the sea, form a

rolling table-land with an average altitude of from 6500 ft. to 7500 ft. This plateau consists for the most part of grassy downs with here and there, "sholas," or thickets of mixed growth, very beautiful at this time of the year owing to the red colour of the young leaves of the preponderant tree. Unfortunately, alike for the entomologist and the artist, these "sholas" have been largely cut down to make way for the extensive Government plantations of eucalyptus, which are by comparison dreary and monotonous.

On the way up the cog-wheel railway I saw on the side of the cutting two beautiful blue-green Papilios, which may have been either *P. telephus*, Feld., or *P. teredon*, Feld. At about 4500 ft. I netted a *Neptis varmona* from the train in motion.

It was evidently too early in the year to get many butterflies at Ūtakamand, the elevation making the nights cool, so it was necessary to seek out sheltered flowery banks facing south, or preferably south-east. In two such spots within a very circumscribed area *Talicauda nyseus* was common; a single example also occurred [along with the inevitable *Pyrameis cardui*] on the grassy top of an isolated and exposed peak of about 8000 ft. This Lycænid is quite typical of "South India and Ceylon"; it is a conspicuous insect on the wing, its tricolour of black, white and orange-red, which should delight German entomologists, making it look larger than it really is.

Terias hecabe was rather common, but worn. A female *Lycæna baltica* and several *Pyrameis indica* were also old friends, and the same applies to two or three *Papilio aristolochiæ* seen at flowers in the hotel garden, the latter a good deal the worse for wear.

A few *Ypthima cheui*, Guér., occurred at about 7800 ft., the only *Satyrid* I met with at Ūtakamand. *Ganoris canidia* flew up to 8000 ft.; a male had a distinct smell like that of our *Pieris rapæ*. I submitted the living butterfly to my daughter and her lady friend, who both noticed the scent, though unable to describe it. When *mignonette* was suggested for comparison they both said "No"; but when sweet-briar was mentioned they said it was like that, my daughter speaking the more confidently of the two.

At about 7400 ft. I took a female *Calophaga paulina*, and also a fine female of *Hipposcritia narcendra* [Moore], quite a

Ceylon species. The specimen is labelled "flies fast: rather common from 7400 ft. to 8400 ft." It is but too evident that I had not recognized that I was catching anything out of the common, and it is more than probable that I confounded the females of *Catophaga* and *Tachyris* with *Hiposeritia*, so that I am not by any means disposed to trust the statement that *H. narendra* was common then and there. One necessary consequence of my complete ignorance of the Indian fauna was that I did not know what was most worth catching. These white butterflies are as a rule by no means easy to catch and were often in bad condition, but in each locality I used to endeavour to secure one or two good samples. Doubtless the *Hiposeritia* passed for a very fine *Tachyris*.

Amongst herbage *Mecyna polygonalis*, Hb., was often kicked up, having much the habits and appearance of my old Bermuda and Mortehoe friend *Stenopteryx hybridalis*, Hubn. (*Nomophora noctuella*, Schiff.), which too was fairly common in exposed situations at about 8000 ft.; at a similar elevation a single example of the Danaid *Badacara nilgiriensis*, Moore, was taken.

Above the Botanic Garden on the road to Dodabetta, at about 8000 ft., I several times saw, but missed, *Vanessa charonia*, Dru., a butterfly that looks dingy in the cabinet, but on the wing looks much brighter and bluer than would be expected. It is sometimes called the Blue Admiral (completing the trio), though in truth it is much more like a tortoise-shell. *Argynnis niphe* was common at the higher elevations, and in exposed situations up to 8500 ft., reminding one of *A. aglaja*, L. It flew up and down the roads, returning again and again to the same spot.

The commonest and most characteristic butterfly of Útakamand was the pretty little *Colias nilgiriensis*, Feld., which was seen coursing over the grassy downs from 7300—8600 ft. Its flight is moderately fast, but quite close to the ground. It was somewhat startling, but in a way refreshing, to come across this Arctic survival so far within the tropics, associated moreover with species characteristic of Ceylon. As it was especially abundant in the hotel garden I took the opportunity of examining five males for scent; in two cases I suspected the existence of a slight scent, but in the remaining three the result was negative.

From Útakamand I moved to Kouúr, which stands on the southern edge of the plateau, overlooking the plain.

It is at about 6500 ft. above sea-level, or 1000 ft. lower than Útakamand. At this elevation *Colias nilgiriensis* was not nearly so common as at the higher levels.

Worn *Pyrameis indica*, a few *Neptis varmona* and *Precis iphita* turned up here and there. Of a pair of *Terias hecabe* taken in copulá, the male proved to be of "intermediate dry," the female of "pronounced dry" type. Opportunities of noting the pairing of the several forms occurred very rarely. Here I secured one specimen of *Ypthima ceylonica*, Hew., another foretaste of the great southern island. *Y. inica*, Hew., turned up at about 5800 ft., but at about 6500 ft., in a clearing in a wood, I found *Y. hübnéri*, Moore, together with *Y. chenui*, Guér., and *Y. philomela*, Joh. There were swarms of these *Ypthimas* on that sunny bank, but as I did not distinguish the species at the time I cannot now say of what the bulk of them consisted. Some of the specimens have injuries to the wings, which from their shapes may have been inflicted by birds, but I attach little importance to them, especially as the injuries are unilateral, since the wings of *Ypthima* (and to a somewhat less degree of *Mycalesis* also) are so fragile that quite unbroken specimens are exceptional.

The genus *Papilio* was represented by a couple of *erithonius*. As usual *Argynnis niphe* showed a preference for lofty and bare places. On one occasion I watched a female of this species for some time under the impression that it was *Limnas chrysippus*! The resemblance on the wing is greater than might be supposed. *Vanessa charonia*, Dru., which had before eluded me so often, fell a victim at last; I secured two specimens on a shady road through a wood. It settles on rocks or walls, a habit that makes it hard to net, moreover it is shy and easily disturbed, though usually coming back again to its resting-place.

Stenopteryx hybridalis was common in grassy places, and I took the Boarmid *Bilactis inceptaria*, Walk., flying in the hotel garden at dusk.

It was tantalizing to be told by the hotel manager at Konúr of the immense number and variety of butterflies there in the summer. I was, however, fortunate in making the acquaintance of a dealer, named Solomon, a coloured man, who told me that at that time of the year it was no good collecting on the high ground, but for a consideration he agreed to show me a very good place

near the foot of the hills. Accordingly I went with him on March 2nd, and again alone on the following day. This involved travelling by an early goods-train to Kallár, the first station on the mountain railway above Mettupálayam, about 2000 ft. above the sea, but only 200 ft. to 300 ft. above the plain. Here, as in other parts of India, the best places for insects, at any rate in the winter season, are to be found in the belt of jungle at the foot of the hills, or in the woods on their lower slopes. But it is just in these places where the dreaded *Anopheles* is as abundant as the *Rhopalocera*, and the station-master at Kallár told me that entomologists always slept at Konúr and went up and down by train to avoid the nocturnal terrors of the deadly malaria—the tiny, innocent-looking *Anopheles*!

The collecting-ground was various, and included, besides bushy jungle with plenty of flowers near the station, large irrigated banana and betel-nut plantations as well as the bed of the river with its bordering woods.

The first thing to catch the eye was *Papilio hector*, L., and very magnificent he looked fluttering at the flowers of *Lantana* in his crimson-and-black suit set off with white. This is indeed one of the most striking butterflies that I met with in my travels, with its wings expanding four inches and upwards. It proved to be distinctly common, but one does not get within reach of every *Papilio* that one sees, nor indeed does one succeed in netting all that are struck at. *P. hector* was accompanied by plenty of *P. pammon* and a few *P. aristolochiæ*. One of the *P. hector* brought home is remarkable for the fact that the whole of the tips and half the hind-margins of both hind-wings have apparently been bitten off, almost absolutely symmetrically, by some foe. If the red spots on the under-side be really "warning marks" this is the more noteworthy.

A boggy, but sunny, corner of an irrigated banana-garden produced single specimens of the fine Skippers *Tagiades atticus*, Fab. [? = *T. menaka*, Moore] and *Tagiades distans*, Moore.

This same garden and the adjoining plantations of betel-palm (*Arca catechu*) yielded a few *Melanitis ismene*, a fair number of *Mycalis perseus*, Fab., as well as *Ypthima marshalli* and *Y. philomela*, Joh. [= *balus*, Fab.]; there was also abundance of the pretty and very distinct *Ypthima ceylonica*, Hew., with its silvery-white

hind-wings, which tried, not without occasional success, to pass itself off as a Blue. A few hasty observations on this species when at rest failed to detect any such "list" as is common in many members of the family.

I sent home two specimens of *Mycalesis perseus*, one an ordinary example of the dry-season form in which the ocelli are indicated by faint dark dots, the other (unfortunately very tattered) in which the full complement of ocelli on the under-surface is indicated by conspicuous chalky-white spots of varying sizes, to wit, two large and one small on the primaries and two large and five small on the secondaries. Three of these spots are faintly visible on the upper-surface. There are no rings and no pupils to the spots. It would appear to be a unique aberration of the dry-season form. In the shade along with the above Satyrids was the inevitable *Nymphitona xiphia* and a solitary male *Elymnias undularis*.

A weedy neglected field near the river yielded besides *Limnas chrysippus* and *Atella phalanta* plenty of the "orange-tip" *Ixias marianne*, as well as a smaller number of the more gaudy *Ixias pyrene*. One proved to be a worn specimen of the female lacking the orange tip, a distinct and well-marked variety; another was of the racial form *cingalensis*, Moore. The "whites" *Huphina nerissa* and *Catophaga paulina* were in plenty. A single *Catopsilia pomona* was netted, a somewhat papery-looking insect, especially on the under-side, also several *C. pyranthe* of the "transitional *Gnoma*" form. In one of the latter (a male) I detected a faint scent, but less like that of jasmine than in the *Catopsilias* examined at Anantápúr. In the same field *Telchinia violæ* was abundant, while *Eryolis ariadne* was, as usual, common among *Ricinus*.

But all this time Solomon was most anxious to get me down to the river. This is a rapidly-flowing stream, occupying perhaps half its bed, and having on either bank sloping woods of mixed growth. Solomon sought out a place where a tiny tributary emerging from a rushy swamp trickled over the damp sand. He forthwith stuck into the wet sand a foot or so from the rill and well clear of the herbage, three or four large butterflies of which he had netted worn or broken specimens; then he stood by to watch. Nothing much happened, for unfortunately clouds had come up and the afternoon was only partly sunny, whereas to get many things at water, whether decoys be

used or not, it needs, as Solomon put it, to be "plenty hot." It was indeed hot enough for most Europeans, but not up to the exacting butterfly standard. However, next day the conditions were more favourable, and I found near what was left of Solomon's decoys a number of "whites" and "orange-tips." Accordingly I put down a few more decoys and walked away. After spending some time in vain endeavours to catch the conspicuous *Hebomoia glaucippe*, L.—giant of orange-tips—which was careering wildly about in all directions, I returned to the decoy-place and sat down just within the reach of my six-foot net-stick. *Catophaga paulina* were there in abundance, but all males, mostly sitting quite close together, almost touching, with wings erect so that the "hook-tip" of the fore-wing was very conspicuous; in another cluster close by were from six to eight *Ixias marianne*.

It will perhaps give some idea of the numbers when I say that I quite easily netted five *C. paulina* in one swoop, and seven in another.

Then *Hebomoia glaucippe* came along, reconnoitred the position with great circumspection, and settled warily for a second or two, but darted swiftly off at the least movement on my part. Nevertheless, with care and patience, I managed to secure a couple of specimens. My old friend *Papilio erithonius* came next and soon settled down a short distance away from the "whites," he was shortly followed by another and yet another: they all settled close together, within a hand's-breadth, forming an exclusive community and continued to drink steadily. All at once a blue-green flash, and *Papilio telephus*, Feld., sailed close past me; again and again he came, and finally, looking askance at the vulgar assemblage of "whites" and "orange-tips," settled quite close to the *P. erithonius*, evidently preferring their more select company. This occurred several times. *P. telephus*, when settled with wings erect, displayed an unexpected beauty, for, in place of the ebony and emeralds on the upper-surface, it shows beneath nothing but sheeny mother-of-pearl picked out with tiny rubies. By patient watching and judicious swooping I secured three specimens, and, be it remembered, these were all I saw that day. So much for water; what share the decoys had in my success it is hard to say, but Mr. E. E. Green, of Peradeniya, told me that decoys were efficacious, and Mr. Denton, of Regent Street, says that he has used even paper decoys with success.

The congregation of butterflies at damp sand was observed by Bates on the banks of the Amazon in 1849. He noted that they were all males, mostly of the genus *Callidryas*.* Indeed Sir J. D. Hooker had the year before noted butterflies sitting on damp sand "in thousands" in the Ranjit valley, Sikkim.†

Mr. E. André noted a similar thing in Venezuela in 1897, where the attraction was the foul mud of a farm-yard: the butterflies were chiefly *Callidryas*, with some *Heliconius*, *Papilio*, *Metamorpha* and *Cærois*. He says: "Each species tried to herd with its own kind," but he says nothing as to sexes. There is a capital photograph in his book of a group of *Callidryas*.‡

Doubtless this habit of butterflies is well known to all tropical collectors. I myself in Germany some 35 years ago, noted swarms of Blues at small puddles in the road—several species together, including, so far as I could see, *L. albus*, *L. arion*, and *L. bætica*. A few days afterwards near the same place and similarly occupied I caught *Apatura iris* in my hat! This summer at Mortehoe, on the 1st of August, in the early afternoon, I saw 14 or 15 *G. napi* sitting close together on wet mud; they were all males.

A piece of waste ground adjoining the plantation of the singularly graceful *Areca* palms, covered with *Lantana* in full bloom, was crowded with butterflies such as *Crastia core* and *Narmada coreoides*, Moore, one or both of which (for I did not distinguish them when alive) was abundant; several *Neptis varmona*, and two or three *Nepheronia ceylonica*, Feld., another southern species. More striking than all these were the swarms of *Tirumala limniace*, a big and handsome black and bluish-white Danaid, which I found all over India but never saw elsewhere in anything like such numbers as on that mass of *Lantana*.

Other things that turned up in the course of the two days' collecting were *Tachyris hippo*, two; *Teracolus etrida*, one; *Hypolimnias bolina*, two males; *H. missippus*, one male; *Precis iphita*, common; *Caprona ransonnnettii*, Feld., one; *Parnara mathias*, one; *Castalius rosimon*, and plenty of *Lampides celeno*, Cr., including the form *conferanda*, Butl.

Of the above the fine Skipper, *Caprona*, was seen to settle, in full sunshine, on the under-side of a leaf, with its

* "Naturalist on the Amazons," 1st edn., p. 249.

† "Himalayan Journals."

‡ "Naturalist in the Guianas," p. 142.

wings fully expanded like a Geometer. I do not ever remember seeing a butterfly do this before, but then we are perhaps wrong in calling Skippers butterflies. One of the *Lampides*, a female (?), was found settled close to the ground, with all its wings erect as usual and close together; it was however moving its hind-wings alternately, in a rhythmical manner, *in the plane of the wing*, about 10–15° forward and then back. No other specimen of the species was near it.

On the occasion of my first visit to Kallár, as we were walking back to the station, Solomon suddenly darted off like the wind, and I found that he was after a very large *Papilio* which he had caught sight of flying about a puddle in the road, some hundred and fifty yards off. He waited long and patiently until it settled to drink and then popped his net over it. It was *Papilio polymnestor* in splendid condition, black and French grey, 5½ inches in expanse! This haughty beauty was not kind to me at Kallár; many a time I caught a glimpse of her flying about in a supercilious sort of way, but she never gave me a chance of closer acquaintance. Solomon had the advantage of me in many ways, first and foremost in years, next in his keen sight, but he was also wily and skilful with his net. During the day he took among other things a specimen of *Papilio agamemnon*, L., a fine black-and-green fellow that I too had seen; also one of that grand diamond-beetle green butterfly *Papilio crino*, F., which I missed the next day at *Lantana* flowers, as I believe, through sheer excitement!

Trichinápalí, lat. 10° 50' N., alt. c. 400 ft. or less.

March 4th and 5th, 1904.

My collecting here was almost confined to the banks of an irrigation canal, where the genus *Papilio* was represented by *P. hector*, *P. pammon*, and *P. aristolochiæ*, of each of which I saw several.

Limnas chrysippus was common; in the male of *Tirumala limniace* I detected a very faint scent, suggesting old cigar-boxes.

Catopsilia pyranthe was rather common, the specimen preserved was of the intermediate form; I noted a scent in the male, but it was not so strong as in some of the Bankápúr specimens. Of *Delias eucharis* I took two

females, by far the less common sex, at all events in collections. Of *Huphina nerissa* I took one of each sex. *Terias hecabe* was abundant.

The most striking fact about the butterflies of Trichinápali was the predominance of the genus *Teracolus*; of these I met with three species: *T. eucharis* was in abundance, but I find my specimens comprise eight males to two females; of *T. etrida* I took two males; and I was greatly delighted to see here for the first time that truly exquisite little gem the crimson-tipped *T. danæ*. It proved to be rather common, and I secured two of each sex. It is one of the most "elegant flies" that I have ever seen alive.

Precis orithyia was common, the specimens small and brilliant; *P. lemonias* was in larger numbers than I met with anywhere else, in fact quite abundant; *Ergolis ariadne* was common; I netted a pair of *Hypanis ilithyia* in copulâ, one was of the "wet-season" form, the other "intermediate" tending to "wet." As usual *Telehinia violæ* was common.

I took here one specimen of that beautiful Lycænid with the under-side striped like a tiger, *Spindasis vulcanus*. This is one of the butterflies with an anal lobe to the secondaries, but unfortunately I had not an opportunity of observing it at rest. *Lampides celeno*, Cr., was common; some smaller and dingy Blues were abundant, *Zizera otis*, Fab., var. *indica*, Murray, and *Chilades varunana*, Moore, thought by De Nicéville to be the wet-season form of *C. laius*. I also took one specimen of a small bright golden Skipper, *Ampittia maro*, Fab.

Tanjûr, lat. 10° 47' N., alt. 350 ft. or less.

March 6th, 1904.

The predominant genus of the plains of Southern Madras would appear to be *Teracolus*, which was represented in my envelopes from Tanjûr by a male *T. etrida*, a pair of *T. eucharis*, and five males and two females of my favourite crimson-tip, *T. danæ*, which was quite common.

Of *Catopsilia pyranthe* I took a dwarf male of the intermediate form. *Terias hecabe* was common, and I took a very large female [over 1·8 inches in expanse, it was

"dry"]. Single specimens of the following were sent home: *Nychitona xiphia*; *Papilio pammon*, male; *Limnas chrysippus*, female; *Castalius rosimon* and *Lampides celeno*, Cr., of the form *conferanda*. *Telchinia violæ* was common, one being of a fine red colour.

Máadura, lat. 9° 55' N., alt. 600 ft.

March 7th, 1904.

This was about the least productive place that I visited. *Limnas chrysippus* was scarcely common. A male *Huphina nerissa* gave out the sweet-briar scent quite strongly. I saw several *Telchinia violæ* upon a railway bank. *Precis ænone* was fairly common, but *P. almana* was commoner here, about the irrigation ditches bordering meadows, than at any place I visited; they were of the "intermediate dry" form. *P. lemonias* was also abundant, some of them being very brightly coloured.

In a grove of young palms near the river a singular dragon-fly, *Libellula variegata*, Linn., was common; the tips of its wings are transparent and colourless, but the basal three-fifths of the primaries, and the basal five-sixths of the secondaries, are light-brown with a bold dark-brown pattern. I believe that I saw the same creature in the Kudsia Gardens at Delhi, flying near the tops of trees, and then, as in the present case, took it for a *Heliconius*-like butterfly, which it greatly resembles on the wing. As I did not know that any butterfly of that shape was found in India I was greatly excited at seeing it, and proportionately disappointed when I at last effected its capture.

This was the last place at which I collected in India.

Ceylon, lat. 7° N.

All the places that I visited in this beautiful island were within twenty miles north or south of the seventh parallel of latitude. The luxuriance of the vegetation was an immense relief after the parched plains of India. At the lower elevations it was more distinctly tropical than any that I had yet seen, but this character was lost at greater altitudes.

Pcrazeniya, alt. c. 1200 ft.

March 10th, 1904.

These justly celebrated gardens lie about four miles south of Kandy near the centre of the island. Their situation is beautiful and all the familiar "hot-house plants" grow luxuriantly. Splendid palms of many kinds, huge bamboos almost as tall, *Dracenas*, *Crotons*, *Acalyphas*, *Marantas*, nutmeg, cinnamon, camphor, huge trees of *Ficus elastica* with roots spreading far over the surface, etc., etc. Grass has been largely ousted by the sensitive-plant, *Mimosa pudica*, which, introduced from South America, has run wild. It grows about a foot and half high, and when one walks through it a broad path is left owing to the collapse of the leaves.

Here, well out of reach, I saw my first *Ornithoptera*, truly it is well named; I missed a second specimen through sheer excitement. Several *Catopsilia pomona* were netted, one was a female verging on the *catilla* form, the others were typical males, one of which had a slight scent. Of three male *Terias hecabe* two were wet-season, the other of "intermediate wet" form. A male *T. libythea* was also of wet-season type, a female was also taken. The only Nymphalids noted were two *Neptis varmona* and several *Precis iphita*. Here also I took my first *Parantica ceylonica*, Feld., a Danaid found in abundance later.

Of *Mycalesis mandata*, Moore, I only saw one, but the pretty little *Ypthima ceylonica* was swarming amongst the sensitive-plants. Mr. E. E. Green, the entomologist to the Ceylon Government, suggested that its colouring might be indirectly protective, since on the wing it looks much smaller than it is, only the white posterior two-thirds of the hind-wings being conspicuous, and these the least vitally important to the insect. The only Blue seen was *Zizera karsandra*, Moore.

A second visit to the gardens, rather late one afternoon, produced no insects, but gave me my only sight of a wild cobra, about 2½ feet long, with a very large "hood"; it crawled quickly away into the roots of a "travellers' palm."

Unfortunately for me Mr. Green was on the point of going to England on leave, but though busy with his preparations for departure, he was good enough to show me several very interesting things, such as larvæ of the

leaf insect, young snakes, etc., and above all he gave me some very useful advice. Peradeniya, he said, was not as rich a locality as Kandy; and, as regarded the highlands of Ceylon, he told me that, at any rate at that time of the year, Lepidoptera were for the most part confined to certain favoured spots, which it was unlikely that I should hit upon. He therefore strongly recommended me to concentrate my attention on "Lady Horton's Drive" at Kandy.

Kandy, alt. 1500 ft.

March 11th—15th, 1904.

On the south side of the artificial lake at Kandy stand some low hills, covered for the most part with natural forests, through which have been cut a number of roads named after the wives of former governors. Lady Horton's Drive is one of these, which runs about half-way up the hill, winding around its southern and eastern slopes. A wide road, bounded on either side with forest of rich and varied tropical growth, lying fully open to the morning sun, commanding moreover a glorious view over groves of palms to the bluest of distant hills, it affords an almost ideal collecting-ground. The climate of Kandy, so far as I experienced it, is delightful, tropical heat tempered by elevation, and with a pleasant softness in the air, yet free from the excessive damp of many places within the tropics. Its vegetation is by far the richest that I had seen. My pleasure in collecting in this earthly paradise was greatly enhanced by the companionship of Mr. W. G. Freedley, junr., a Philadelphia gentleman who had been collecting butterflies in Borneo, Celebes, Japan, Macao, etc.

In such a locality it was perhaps to be expected that Pierines would not be dominant, at any rate so it was. By far the commonest of the family was *Catopsilia pomona*, of which the males were very abundant, but strong fliers and by no means easy to catch. We remarked that they usually all flew in the same direction, and that uphill. As the females were comparatively scarce one was not surprised to see more than once signs of jealousy on the part of the males. I detected a slight jasmine-like scent in the male on stroking the "scent tufts" on the hind-wings. A female *Terias hecabe* had apparently been bitten in both hind-wings when at rest, the injuries being

more or less symmetrical. *Delias eucharis* was scarce, *Catophaga paulina* more common. In one case I saw a bird try to catch a specimen of the latter on the wing; the bird missed its quarry, but I was more successful; it proved to be a male.

The Danaids were well to the front, the commonest species being *Parantica ceylonica*; it is smaller and greyer than *Tirumala limniace* and varies considerably in size, a small male measuring only 2·5 in., a large female as much as 3·4 in. across the wings. It was curious that this species became quite abundant late in the afternoons, as other things were retiring. I was surprised to find that a male when fluttering in the net gave out a strong scent like that of *Crastia core*, i.e. very like acetylene. This was noted in two or three specimens, and was quite unmistakable. *Danaüs septentrionis*, Butl., appeared to be rather common. A female has the hind-wings much broken, perhaps from the bite of a lizard, but the breakage is only in part symmetrical. *Limnas genutia*, of which I took a very small one, was very scarce, and I did not see *L. chrysippus* at all. The genus *Crastia* was represented by many individuals. I took five *C. asela*, Moore; of one of them I noted at the time, "has a scent as in *core*."

But the most prominent group of butterflies at Kandy was assuredly the *Papilionidæ*; I met with six species. The most remarkable was *Ornithoptera darsius*, Gray, peculiar, I believe, to Ceylon, an insect that I had greatly wanted to take; it appears to be fairly common, as I saw two at Peradeniya, seven or eight at Kandy, and two at Haragáma. It sails about somewhat slowly and in a dignified manner, looking very distinguished in its rich yellow-and-black livery and impressive by its size, five and a half to six inches expanse of wings! When it comes within reach it is not hard to catch, and I secured two males and a female, but it is a formidable-looking creature in the net, with a thorax suggestive of a Bombyx. Mr. Freedley told me that the males have a scent like sassafras, but I learned this too late for confirmation. The male *Papilio pammon* was common enough, one specimen was unusually small, measuring under three inches. Two specimens of *P. aristolochiæ* (a distasteful butterfly) were brought home; one of them has the tips of the hind-wings up to the tails bitten off quite symmetrically, thus much resembling the mutilated specimen of *P. hector* taken at Kallár. Of the tailless

P. dissimilis, L., I took three, but probably saw more, since it so very closely mimics *Tirumala limniace* or a large *Parantica ceylonica*, as easily to pass for one of those insects; it is indeed most easily distinguished from them by its habit of fluttering while feeding on a flower. One of my specimens has the anal angle and a great portion of both hind-wings bitten off in an almost symmetrical manner, suggesting the bite of a lizard. It should be noted, as was observed long ago by the President, that, whatever the cause may be, it is in the great majority of cases the *hind-wings* that suffer these injuries; doubtless the framework of the fore-wings is the stronger, but that does not seem to be a sufficient explanation, since from their greater length they must be more exposed to chance injuries from thorns and the like. Mr. Freedley took a *Papilio* that mimicked *Euplœa*, but I believe that *P. dissimilis* is dimorphic, one form mimicking each genus. Indeed it would appear that the name *dissimilis* implies that its bearer is like anything rather than a *Papilio*.

In a shaded glen down which a tiny stream and a foot-path strove for the possession of the ground, I took close to the water a faded specimen of my Kallár acquaintance *Papilio telephus*, and missed another that was drinking at the mud. But far more exciting than all the before-mentioned species was *Papilio polymnestor*, or as Moore has it, *P. parinda*, a truly magnificent fly that dashed about in all directions. It measures about $5\frac{1}{2}$ inches across the wings and is rendered most conspicuous by its colouring—French-grey and black. It rarely settled and was very hard to catch; Mr. Freedley and I were constantly striking at it, but it almost always eluded us. After many fruitless attempts I succeeded in netting two, one so battered that its powers of flight were seriously impaired; Mr. Freedley was even less fortunate, probably because he had a very small net.

There was yet another *Papilio* which eluded me altogether. It was black-and-green and I feel pretty sure *P. agamemnon* [which I also missed at Kallár in the Nilgiris]. It had the extraordinary and most aggravating habit of flying up and down, or rather backwards and forwards, just like a sentry, over some small trees below the road. Its path, if one may so call it, was about a dozen yards in length, and it always turned round at the same place, moving by a succession of jerks. I once actually

watched it for twenty minutes so occupied, it then settled for a moment on a *Lantana* flower; I struck at it and missed, and the performance began again! Another day I saw it at its post as before. Of all the *Papilios* that I saw this species was by far the variest.

In striking contrast to the *Papilios* in every way are the *Satyrids*. A single *Calysime* [*Mycalesis*] *perscus* [= *medrus*, Fab.] was a very dingy shade-lover. The bright little *Ypthima ceylonica* was abundant; so far as observed it sits upright. *Nyssanga patnia*, Moore, a very distinct species, with leaden metallic lines on the under-surface, was fairly common at the edges of woods, but I did not meet with it on the "patnas" or grassy plains of the highlands of Ceylon.

The *Nymphalines* met with included several interesting species, notably *Cynthia asela*, Moore, of which I saw a very fine example, but caught only a very tattered fellow. It seems to like sailing about over the trees. With *Cethosia nictneri*, Feld., I had similar ill-luck. Of *Cupha placida*, Moore, again I have but a very worn specimen annotated thus: "Has the swift flight and to some extent the habits of *Precis*, but is fond of resting on the leaves of trees." These remarks are probably intended for, or at least include, the allied *Cirrochroa cognata*, Moore, which was certainly common, though very local; one of my five specimens, otherwise in good condition, has two snips taken out of each hind-wing, symmetrically, but it appears to be an insect readily chipped. Both these species have fulvous wings with black tips, so they are readily confounded in the field.

Neptis varmona might be said to be abundant, while its ally, the brown-and-black *Rahinda sinuata*, Moore, was decidedly common. In this connection may be mentioned the *Erycinid* *Libythea rama*, Moore, which appears to mimic *Rahinda*. I secured one specimen at Kandy, and believe that I missed another in the Pashók tea-garden near Darjiling.

I saw no females of *Hypolimnas bolina* at Kandy, but took three males, one of which had lost both the anal angles of the hind-wings, the injury being in part symmetrical. *Precis iphita* was common, so was *P. atlites*, looking on the wing like a dingy *Neptis*; a new brood appeared on March 14th. *Eryolis merione* was common.

The *Lycænids* were not well represented, but I saw

several *Loxura atymnus*, Cr., var. *arcuata*, Moore; as usual *Lampides celeno* was common, almost spangling in the sunlight, one specimen was so unusually brilliant as to recall *L. adonis*; *Talicauda nyseus* brought up the rear.

The Skippers were represented by single examples of *Parnara mathias*, a dark fulvous *Iambrix salsala*, Moore, and the dingy *Spalgis epius*, Westw.

At rest on a fence outside the "Queen's Bath" I found one morning a fine Sphinx, *Meganotum melanomera*, Butl. A very distinct-looking Arctiid having a crimson body and light pink fore-wings, with a longitudinal fuscous streak, *Cretonotus interrupta*, Linn., came to light, as also did *Eupterote diffusa*, Walk., a Lasiocampid.

A few insects of other orders forced themselves upon me, busily occupied as one was, e.g. a very large, black ♀ carpenter-bee, *Xylocopa tenuiscapa*, West., with peacock-green wings; a very large, evil-smelling, brown bug, covered beneath with a waxy substance that during life glistened like silver, *Tessaratoma javanica*, Thunb. Another bug, *Chrysocoris stockerus*, L., was an intense metallic green with black spots; yet more conspicuous than any of these was the large Fulgorid *Hotinus maculatus*, Oliv., or so-called Lantern-fly, expanding three inches across the wings. Its fore-wings are black-and-white, the hind-wings light blue with a very broad black border. This was fairly common, flying high and settling on tree-trunks out of reach, but easily disturbed, when it flies off to a similar resting-place.

Haragáma, 11 miles S.E. of Kandy.

March 12th, 1904.

This appears to be locally recognized as a great place for butterflies; the collecting-ground is along the course of a rapidly-flowing stream with wooded banks, perhaps 500 ft. below Kandy, or say, 1000 ft. above sea-level.

Again, I had the advantage of Mr. Freedley's company on the occasion of my expedition. The first thing to catch our attention was *Hebomoia glaucippe* careering about in considerable numbers, but most unwilling to be caught.

The pretty little *Talicauda nyseus* was literally swarming. I cannot remember ever having seen a *Lycænid* in such numbers. I repeatedly observed this butterfly settle with

its head upwards and immediately turn round so that its head looked downwards. This habit of resting with the head down is common, if not general, in the family, and has an obvious bearing on the protective use of tails, anal lobes, and directive marks.

Zizera otis, Fab., was also in abundance, and *Lampides celeno*, Cr., was common.

Tirumala septentrionis was not common, and the specimens netted were tattered males; one had a symmetrical injury near the anal angle of the hind-wings, possibly due to the bite of a bird. I saw a few specimens of *Crastia asela*, Moore, and secured two males, which exhibited the "acetylene odour."

Neptis varmona was common, and I took a specimen of the elegant Nyctemerid day-flying moth *Trypheromera nigrovenosa*, Moore, which seems to mimic it. Of the beautiful *Nepheronia eeylonica* I took one male. *Cirrochroa cognata*, Moore, was noted flying about a particular tree and did not appear to be attracted by flowers; I only saw it in that one spot, and the two taken were in poor condition. It is very like *Cupha placida*, Moore [= *Messaras crymanthis*, Stgr.], of which I took a fine specimen close by, at wet sand. I again confounded the two species as at Lady Horton's Drive. A few *Ergolis ariadne* and several *Nychitona xiphia* were seen. A male *Huphius nerissa* had the sweet-briar scent; a female was in fine condition.

At the furthest point reached in our walk, by a little bridge, two or three spots in the damp sand appeared to be very attractive. Besides the *Cupha* already mentioned there was *Ixias pyrene*, var. *eingalensis*, and *Papilio pammon*, the male, was rather common. [It was also seen flying about bushes, but not at flowers.] My Kallár friend *Catophaga paulina* was literally in crowds; they were all apparently males, sitting in dense clusters, their pointed white wings suggesting to me toy encampments. I easily netted ten at one swoop, while Mr. Freedley by a more cunning movement succeeded in getting as many as thirty-four into his net! In the same place I saw six or seven of the beautiful *Papilio telephus*, Feld., settled quite close together, and managed to secure three. It is a black-and-green species not easy to distinguish from *P. jason*, L.

The females of *Catophaga paulina* were common at flowers. One of the males, by the way, had a symmetrical injury to the tips of the hind-wings, but I can hardly see

how it could have been inflicted by an enemy without simultaneous injury to the fore-wings.

This day I saw two *Ornithoptera darsius*, one quite out of reach, the other I missed badly.

Hatton, alt. 4200 ft.

March 16th—18th, 1904.

In going up-country from Kandy when near Ullapâne station [alt. c. 2500 ft.] I caught, *from the train*, *Narmada montana*, Feld., and a little further on, c. 3000 ft., a male *Catophaga paulina*, a species that is very abundant in the Ceylon highlands.

Before Hatton is reached the line enters the tea country, whence the glorious primæval forests have disappeared, having been ruthlessly and completely cleared out to make way first for coffee and later for tea. Though doubtless "grateful and comforting," the tea-plant is most unpicturesque, only slightly surpassing the potato in that quality. The *Grevilleas* with their light feathery foliage, planted in regular rows to slightly shelter the tea from sun and wind, do but little to relieve its stiffness, and are a miserable substitute for the departed woodland glories. About Hatton there are but scraps of the forest left on the tops of the highest hills, and we were told that the tea-planters are constantly urging the Forest Department to allow these to be improved away. It results that what once was doubtless a grand entomological locality is now a very poor one.

Here for the first time I examined *Catophaga paulina* for scent, and was surprised to find that the three males tested had a scent nearly as strong as that of *P. napi*; it was described at the time as "like sweet-briar, but sweeter and more luscious," and I wrote to Dr. Dixey the same evening, adding "I had no doubt whatever."

About the hotel garden *Argynnis niphe* was common, a male had the fore-wings notably shorter and broader than usual.

A short walk in what is left of the old forest, towards the top of a high hill, say at about 4500 ft., produced several specimens of *Lethe daretis*, Hew., a regular sylvan Satyrid, repeatedly settling on the path, apparently always erect. Two of them have lost large portions of the hind-

wings near the anal angle, one symmetrically and in a way to suggest the bite of a lizard. On the under-surface of this butterfly the unusually large light-coloured scales on a black ground near the hind margin of the hind-wings are striking. In the same scrap of forest I took a single specimen of another species of the same genus, *L. drypetes*, Hew. [= *embolina*, Butl.]; also settled on a leaf of a tree far from the ground, as is usual with the genus, a *Limenitis calidasa*, Moore. Several *Atella phalanta*, a few *Neptis varmona* and *Terias hecabe* were also seen, a female of the last-named being of the "completely wet" form.

A specimen of *Cyaniris singalensis*, Feld., is very like our *argiolus*. With some difficulty I secured a specimen of the large black-and-white Skipper, *Celaenorrhinus spilothrys*, Feld. This is the second Skipper [the other being *Caprona ransonnetti*, Feld., at Kallár] that I have seen settle on the under-side of a leaf during full sunshine, the wings being expanded like a Geometer's. Another specimen was settled on a rock with its wings expanded in like manner.

In the hotel I found a fine Burnet (Syntomid) *Euchromia polymena*, Linn., at rest on a wall, it has slender black wings bearing orange spots, the body is blue, ringed and collared with scarlet; and in my bedroom took a beautiful little Tortrix-like Noctua, *Metachrostis incondita*, Butl., measuring only 17 mm. across the wings; also a most formidable-looking long-waisted wasp, *Eumenes pectiolata*, F., a ♀, and *Pomasia psylaria*, Guén., a pretty little yellow Geometer with metallic markings, evidently attracted by light.

When coming down from Adam's Peak on March 18th, at the height of about 6000 ft., I saw several of the Lithosiid, *Asura uniformis*, Hmps., but in the rough scramble of the descent could only secure one; at about 4800 ft. were several *Talicada nyseus*, and a few hundred feet lower down I bottled two green beetles, somewhat resembling our Rose-beetles, but much more shiny, *Coryphocera elegans*, Fab.

Nuwára Eliya, alt. 6200 ft.

March 18th—21st, 1904.

This Sanitarium is in some respects like Ūtakamund, it is situated on a grassy plain forming a basin among

mountains. The "patnas" or grassy areas are bounded by woods, which in their turn are fringed by somewhat stunted scarlet rhododendrons. At the best season it doubtless affords excellent collecting, but I found Mr. Green's statement, that I should be unlikely to light upon the good localities, amply confirmed.

I saw several *Papilio teredon*, Feld., flying about, and secured two that were drinking at wet mud. A female *Terias hecabe* proved to be of the wet-season form. Of *Neptis varmona* I took two. In a sedgy place surrounded by wood, a small "patna," I took the Skipper *Baracus vittatus*, Feld., curiously enough the only butterfly that I had taken in a swamp up to that date. The streaky markings of the under-side, following the veins, appeared when the insect was settled on sedge to be strongly protective. Of *Talicauda nyscus* I saw several, the only other Blue seen was the *argiolus*-like *Cyaniris lanka*, Moore, much battered.

Among moths I found one of the yellow Geometer *Corympha specularia*, Moore, at rest on a tree-trunk, and one Acidaliid *Idæa costata*, Moore. Also on Mt. Pederutalagalla, at about 8000 ft., the Skipper *Baracus vittatus* among sedgy grass and *Abraxas sordida*, Hmps., flying at dusk, nearly uniformly dark fuscous. This last is presumably a scarce insect since the British Museum possesses the type only.

Hakgála, alt. 4800 ft.

On March 19th and 21st I visited the beautifully-situated and well-kept Botanical Garden at Hakgála, some five miles south of Nuwára Eliya and at a considerably lower elevation.

Along the road *Catophaga paulina* was swarming, males with their sweet-briar-like scent appeared to largely predominate. They flew rapidly and always in the same direction, roughly speaking from south-east to north-west. They frequently flew in strings, just as if they were tied together, and reminded me strongly of the strings of floating stars that are dropped by a certain kind of rocket; I often saw three, four or five, and once even seven, so following their leader's every movement.

At a turn of the road close by the garden there was a

small patch of a tall, but small-flowered composite plant (of the Thistle-head sub-order); this plant did not appear to be common in the district, but it was especially attractive to a black Danaid, which was quite abundant within the limits of this plant's distribution. *Chittira fumata*, Butl., is very distinct and handsome on the wing, its flight is slow and it is easy to catch, but like all Danais it has a tough integument and is very tenacious of life. The favoured flower was so attractive to the butterfly that it would even go into deep shade to visit it. *Chittira fumata* may be said to be gregarious; it has the "acetylene" odour of *Crastia core*, but not so strong and with a difference. I made no observation as to the relation of scent to sex in this species, which, by the way, I believe I missed at Hatton.

Near this same spot I took two *Crastia asela*, Moore, and saw others. I also got one *Danais septentrionis*, Butl.

The inevitable Lycænids were worn *Talicada nysus*; *Jamides bochus*, Cr., one; and *Polyommatus baxterius*, which was common.

It was interesting to watch the pretty little honey-birds feeding at some tall spikes of flowers.

Horton Plains, alt. 7000 ft.

March 23rd, 1904.

This beautiful district gives one some idea of what Ceylon was before the era of tea-planting. Situated about 2500 ft. above the railway and approached by steep zigzag paths through rather poor woods, are extensive rolling plains of coarse grass, locally called "patnas"; these are surrounded by woods having a general temperate zone character, but with here and there an epiphytal orchid to remind one that the latitude is but 7° N. In the swamplier parts of the patnas the devastating work of wild pigs was evident enough, while the paths through woods, and unmistakable droppings, proved that wild elephants had passed not many days before. It was however not the season for butterflies, the air being too exhilarating for their luxurious ways.

About half-a-dozen *Chittira fumata* were seen at elevations of 6000—7000 ft., mostly at their favourite

composite. On the patnas and among sedges in the woods were a few of the Skipper *Baracus vittatus*, they were not easy to see. I was surprised to come across no other butterflies on these patnas, which seemed the very place for such a Fritillary as *M. aurinia*, Rott., or such a Satyrid as *C. pamphilus*, L., or at least for a Blue, but no, even the eponymous *Nyssanga patnia* was not to be found.

In the woods I took two specimens of the beautiful *Lethe daretis*, Hew., and saw two or three others. They frequented shady paths and flew but a short distance, settling upon a trunk or branch, reminding me strongly of *P. ægeria* in my own garden at Mortehoe. The only *Argynnis* seen here (or indeed in Ceylon) was *A. niphe*; it was rather common in open spots in woods, the female looking on the wing very like *Limnys chrysippus*; a specimen taken, a female, had the apices of both hind-wings and the anal angle of both fore-wings symmetrically bitten.

Of *Terias hecabe* I found a few in a wood, of the intermediate dry form. *Neptis varmona* was not uncommon in the woods, as usual flying in a ghostly manner, and usually settling upon leaves of trees. In the same woods *Cyaniris lanka*, Moore, was common, but it was astonishing to see so few insects in such a locality.

Haputale, alt. 4500 ft.

March 23rd, 1904.

At this beautifully-situated Rest-house, overlooking the plain and the old Boer prisoners' camp, a great many moths came to light.

Owing to its large numbers the most prominent of these visitors was the small Noctuid, *Ploteia frontalis*, Walk., an extraordinarily variable species; another Noctuid was *Cosmophila xanthindyma*, Boisd.; there were two Deltoids, *Olybama lentalis*, Guen., and *Rivula basalis*, Hmps.; the Lymantriad *Dasychira inclusa*, Walk., and the extremely widely-distributed *Plenyrria fluriata*, Hübn.

The formidable-looking beetle, *Xylotrupes gideon*, L., was an uninvited visitor to my bath-room.

On the same day an Acidaliid, *Idixa costata*, Moore, flew into my face in a tunnel near Ohiya station, alt. 5000 ft.

Colombo, at sea level.

March 25th and 26th, 1904.

Following Mr. Green's advice I went to the Museum and was well rewarded, though too pressed for time to reap all that I might have got by a more deliberate examination of the local collection of butterflies.

My collecting-grounds at Colombo were the Victoria Park, much exposed to the sea wind; the old Cinnamon Garden, said to be much worked for insects by the Museum "boys"; and the old Dutch Cemetery. None of these were very promising or very productive.

However, I saw here for the first time in Ceylon *Limnas chrysippus*; I also netted one *Parantica ceylonica*, and missed what I feel certain was a *Hestia*, probably *jasonia*, Westw., which is, I believe, common at Colombo.

Precis atlites was common in the Dutch Cemetery but worn, so was *P. almana*, nearly all of the wet-season form, *P. asterie*, L.; one specimen however was dwarfed and another was of the "dry" form with the ocelli rudimentary. *P. almana* would appear to be the more prevalent species in Ceylon and Southern India, where it replaces *P. orithyia*, so universal in the North.

I saw several *Delias eucharis* in the Victoria Park, and once more noticed their fondness for lofty flowering trees; those taken were males. In the same place I missed what I think must have been the *catilla* form of *Catopsilia pomona*; its congener *pyranthe* was common and I took two males. Once more *Telchinia violæ* was common, but of *Papilio aristolochiæ* I have only one to record. Of *Ypthima ceylonica* I took two.

Of the Blues there were several species; *Nacaduba norcia*, Feld., was very abundant and decidedly gregarious, it positively swarmed in Victoria Park, though good specimens were scarce. *Ereces argiades*, Butl., var. *parhasius*, Fab., and *Zizera karsandra*, Moore, were also both of them abundant. I took also a single worn specimen of *Castalius rosimon*, Fab.

English is more spoken in Ceylon than in most parts of India, but the Cingalese appear more noted for fluency than accuracy; the inner meaning of the following apparently strange request of a lad is easy to fathom: "Master, buy some butterflies, ready-made." On getting back to the hotel from an entomological expedition one of

the messengers came up to me and said : " Missie told you to told me they had gone in."

An immature locust, *Truxalis nasuta*, L., taken in Victoria Park, completes the list of my captures in Ceylon, an island that I was truly sorry to leave and that will always occupy a treasured place in my memory.

SUMMARY OF BIONOMIC OBSERVATIONS.

Injuries by enemies.

Specimens of the following twenty-eight species were taken which appeared to present injuries caused by the bites of birds or lizards ; save in the two cases specified the hind-wings had borne the brunt of the attack.

Tirumala septentrionis, two.

Cirrochroa cognata.

Precis lemonias, two.

Precis almana.

Hypolimnias bolina, ♂.

Hypolimnias misippus, ♂.

Pyrameis cardui (fore-wings).

Vanessa kashmirensis.

Argynnis niphe, ♀.

Ypthima hübneri.

Lethe dactis, two.

Euretis thetis.

Ilerda epicles.

Pratapa deva.

Polyommatus baticus.

Colias fieldii.

Catopsilia pyranthe.

Ixias pyrene.

Terias hecabe, two.

Terias lœta.

Catophaga paulina.

Ganoris canidia.

Belenois mesentina.

Teracolus etrida (fore-wings).

Papilio hector

Papilio aristolochiæ

Papilio pammon.

Papilio dissimilis.

} red marks on hind-wings attacked.

It will be noted that this list includes no *Limnas*, but does include two *Tirumala septentrionis*, and two *Papilio*s with conspicuous red "warning marks."

In Ceylon a bird was seen to make a swoop at a male *Catophaga paulina*, but missed it. I may here add that at Yokohama, May 19th, 1904, I saw a dragon-fly of moderate size, *Orthetrum japonicum*, Uhler, carry off a *Blanaïda goschkevitchii*; this is a butterfly resembling a very large *Pararge megæra*; it did not appear to struggle at all.

Sideways attitude or "list" when at Rest.

In December, 1878, Col. C. T. Bingham noticed this resting attitude in a species of *Melanitis*, but the account was not published till many years afterwards.* E. H. A.'s papers in the "Times of India," which contained a reference to this habit in *M. ismene* (p. 203), reappeared as "A Naturalist on the Prowl" in 1894.

In the summer of 1903 Dr. Dixey and I noticed this habit in several British Satyrids at Mortehoe, N. Devon. In *Epinephle janira* the list may amount to 15°—30°; in *E. hyperanthus* (G. B. L., 1894) to 20°; in *Pararge ægeria* and *P. megæra* to 25°; but in *Satyrus semele* it reaches 40° or even 50°. This list may be to right or left in the same individual. The insects appear to settle in the upright position, then to draw the fore-wings partly within the hind-wings, and by a third distinct movement to throw themselves over to one side or the other.

To the above insects having this habit I can now add the following Indian Satyrids:—

Mycalesis indistans, slight list.

Hipparchia parisatis, 20° to 30°.

Autoceera swaha, 45° to 50°.

In the last-named species the same individuals were observed sometimes to go over to the right, sometimes to the left; one was seen to make three efforts, getting further over each time. A specimen of *H. parisatis* was observed walking about with a list of 20°.

To these observations I may add that at Yokohama, May 19th, 1904, *Blanaïda goschkevitchii*, a Satyrid like a large *P. megæra*, was observed with a list of 40°.

There is no doubt that this sideways attitude makes the insects less conspicuous when resting on a flat surface, but

* See extracts from Col. C. T. Bingham's Diary for December, 1878, quoted in Trans. Ent. Soc., 1902, p. 363.

I have satisfied myself from observations on English Satyrids that the attitude is more often adopted by the butterflies when sitting in sunshine than in shade. Now if the list be away from the sun the shadow would be increased, but if towards the sun it would be diminished, in some cases even to extinction. Numerous observations are required to determine whether the list has any relation to the sun's position. I would however remark that in the case of a butterfly with cryptic colouring on the under-side the shadow is in many cases far more conspicuous than the butterfly itself, as I frequently observed in India. Obviously, therefore, economy of shadow might be a considerable protection. Now, near Simla in October, 1903, in the case of *Pararge shakra*, a butterfly closely resembling *P. megæra*, I noted three individuals in succession settled with their backs to the sun so as to reduce the shadow to a mere line. This was unfortunately just as I was leaving the locality where the species occurred, but I did not observe any instances to the contrary. I should add that in *P. shakra* I looked for, but did not find any list.*

Scents in Butterflies.

Owing to the imperfections of the human nose these are very difficult to detect and to describe, nevertheless certain definite results were obtained.

* Since the reading of the paper Prof. Poulton has called my attention to the following interesting observation by Mr. E. E. Green. "*M. ismene* is an adept at concealing itself. It usually pitches amongst fallen leaves where its form and coloration are sufficient concealment. But even on bare ground the insect is often extremely difficult to localize, though the approximate spot may have been carefully noted. I have watched the fly, immediately after pitching, alter its position so that its axis is directed towards the sun, thus casting no shadow."—"Notes on some Ceylon Butterflies, *Spolia zeylanica*," vol. ii, pt. vi, Aug. 1904, p. 76.

For the following reference I am also indebted to Prof. Poulton :—Prof. G. H. Parker has clearly established that in the United States when *Vanessa antiopa*, L., after a flight settles in full sunshine with wings expanded, it speedily so adjusts its position as to place the axis of the body as near as may be parallel to the sun's rays, with its head turned away from the sun. Some of the genus *Grapta* have the same habit. He thinks they do this to display their colouring to the best advantage. The bearing of his interesting observations on the cryptic attitude of Satyrids is that they prove decisively that a butterfly can acquire the habit of definitely orienting itself. If one can do this for one purpose, another species may do it for a different purpose, e.g. concealment. Mr. Parker gives a Bibliography of the subject.—"Mark Anniversary Volume," Cambridge University, Mass., U.S.A., Article xxiii, p. 453-469, 1903.

(1) The *rapæ* scent. Dr. Dixey and I have observed a slight scent in *Ganoris rapæ* well compared by Mr. Selwyn Image to that of sweet-briar, though the comparison is not exact. Curiously enough I have been able to prove to my own complete satisfaction the existence of the same scent, or one scarcely distinguishable therefrom, in several Pierines, viz. *Delias eucharis*, *Ganoris canidia*, *Huphina nerissa*, *Catophaga paulina*, and *Belenois mesentina*.

I think it is confined to the male sex, but cannot speak very positively.

(2) The *brassicæ* scent. This is fainter than the preceding; I compare it to violet-powder. It is confined to the male. This scent I did not find in any Indian butterfly.

(3) The *napi* scent. Far the strongest, and quite unmistakable. It is by common consent compared to lemon-verbena, but it is not identical therewith. This I did not meet with in India, but it was unmistakable in the male of the Japanese *Ganoris melete*, Mén. [My specimens were of what Leech calls the Japanese spring form = *G. aglaope*, Motchulsky, = *G. megamera*, Butl.] It proved equally distinct in the male of *G. oleracca*, Harr., a North American form of *napi*.

That three species of one genus have as many distinct scents, but that one of these extends to members of several widely-separated genera is very remarkable, and to me at least totally unexpected. I cannot help thinking that when these scents have been more studied and are better understood they may prove of great value in the solution of phylogenetic questions.

(4) Several Danaids of different genera have a strong and distinct odour of a disagreeable character, very suggestive of acetylene. That it is possessed by the males I am certain, but cannot say whether it is confined to that sex. The species are *Crastia core*, *C. asela*, *C. amymone* (at Macao), *Isamia midamus* (at Hong Kong), *Parantica ceylonica*, and *Chittira fumata*. A single specimen of *Pademna kollari* had a somewhat similar odour. In several cases (in at least three of the above), the scent was so strong as to be distinctly perceptible when the butterfly was fluttering in the net (as it is indeed in the case of *Ganoris napi*).

(5) *Limnas chrysippus* has a faint unpleasant odour like cockroaches, or musk-rats. I suspected it to come from

the pouches on the hind-wings of the male, but more observations are needed.

In the case of *Limnas genutia*, *Tirumala limniace*, *Pararge shakra*, and *Colias nilgiriensis* the existence of scents was suspected, but the results were ambiguous.

(6) The observations of Wood Mason were confirmed in *Catopsilia pyranthe* and *C. pomona*. The tufts on the wings of the males gave out on stroking a scent that may be compared to jasmine, though I think it more like *Polianthes tuberosa*.

Seasonal Forms.

With a view to seeing what light, if any, my fragmentary observations might throw upon this puzzling subject, I have adopted the following method:

In the Register, or Index, of my captures I noted to every Pierine Dr. Dixey's estimate of its seasonal character, and then made my own (far less weighty) estimates of the seasonal characters of the genera *Precis*, *Melanitis*, *Mycalesis*, and *Yphthima*, and then analyzed the results for localities, or groups of localities. The seasonal characteristics were classed under the following five heads:—

- (1) Wet-season form, including "wet," "very wet," and "extreme wet."
- (2) Somewhat wet form, including "intermediate inclining to wet."
- (3) Intermediate form.
- (4) Somewhat dry form, including "intermediate inclining to dry."
- (5) Dry, including "very dry" and "extreme dry."

Without prejudice, and for the purpose of this grouping only, I took *Catopsilia gnoma* to represent the dry-season form of *C. pyranthe*, and in like manner *Catopsilia catilla* and *pomona* to be dry-season forms corresponding to a wet-season form *C. crocale*.

It must be borne in mind that such a classification is necessarily very vague, for while the extreme forms are easy to place it is most difficult to assess the numerous intermediate specimens.

	Wet Season.	Somewhat Wet.	Intermediate.	Somewhat Dry.	Dry Season.	
<i>Precis orithyia</i> . . .	2	2	4	Simla and Kalka, Oct. 10-20, 1903. Slight showers.
„ <i>œnone</i> . . .	...	...	...	...	6
„ <i>lemonias</i> . . .	1	1	...	...	3
„ <i>iphita</i> . . .	...	...	...	...	1
<i>Catopsilia pyranthe</i> . . .	1	...	...	...	1
<i>Ixias marianne</i> . . .	...	...	1	...	...
<i>Terias hecabe</i> . . .	7	...	1	...	...
„ <i>lata</i> . . .	...	2	2	1	...
<i>Huphina nerissa</i> . . .	3	3	
TOTAL . . .	14	8	4	1	15	
<i>Precis orithyia</i>	3	Peshawar and Malakand, Oct. 22-29, 1903. No rain.
„ <i>œnone</i> . . .	...	...	...	...	2
„ <i>amana</i> . . .	...	...	...	...	4
<i>Ypthima balanica</i> . . .	1	...	...	...	...
<i>Terias hecabe</i> . . .	1	3	2	2	1	
<i>Teracolus etrida</i> . . .	...	...	...	1	...
TOTAL . . .	2	3	2	3	10	
<i>Precis orithyia</i>	1	Lahore, Amritsar and Delhi, Oct. 31-Nov. 12, 1903. No rain.
„ <i>amana</i> . . .	...	...	...	1	2
„ <i>lemonias</i> . . .	...	...	...	...	4
<i>Catopsilia pyranthe</i> . . .	7	...	...	...	...
„ <i>pomona</i> . . .	...	1	...	...	...
<i>Ixias marianne</i> . . .	...	...	1	1	3
„ <i>pyrene</i> . . .	1	2	1	...	...
<i>Terias hecabe</i> . . .	5	...	...	...	...
<i>Teracolus etrida</i> . . .	...	...	2	2	2
„ <i>protractus</i> . . .	2	...	...	...	...
„ <i>puellaris</i> . . .	1	...	1	1	3	
„ <i>calais</i> . . .	2	2	...	...	...
<i>Huphina nerissa</i>	2	
<i>Appias libythea</i>	1	
TOTAL . . .	18	5	5	5	18	

	Wet Season.	Somewhat Wet.	Intermediate.	Somewhat Dry.	Dry Season.	
<i>Precis orithyia</i>	2	2	Naini Tal, Luck- now and Benares, Nov. 16-Dec. 2, 1903. No rain.
„ <i>œnone</i> . . .	...	...	...	...	2
„ <i>almana</i> . . .	...	1	...	1	...
„ <i>lemonias</i> . . .	...	1	...	...	2
„ <i>iphita</i> . . .	...	...	...	...	3
<i>Ypthima philomela</i> . . .	...	...	...	...	1
<i>Mycæsis perseus</i> . . .	...	1	...	...	1
<i>Catopsilia pyranthe</i> . . .	1	...	1	...	2	
„ <i>pomona</i> . . .	...	...	1	1	...
<i>Ixias marianne</i> . . .	...	...	...	...	1
„ <i>pyrene</i> . . .	...	...	...	...	1
<i>Terias hecabe</i> . . .	1	...	...	...	1
<i>Huphina nerissa</i> . . .	1	...	...	...	...
TOTAL . . .	3	3	2	4	16	
<i>Precis almana</i>	1	...	1	1	Calcutta, Dec. 4-12, 1903. No rain.
„ <i>lemonias</i> . . .	...	...	...	...	1
„ <i>atlites</i> . . .	1	1	...	1	1	
<i>Melanitis ismene</i> . . .	...	...	...	...	4
<i>Mycæsis indistans</i> . . .	...	...	...	...	2
<i>Catopsilia pyranthe</i> . . .	2	...	...	1	1
„ <i>pomona</i> . . .	...	1	...	4	...
<i>Ixias pyrene</i> . . .	...	...	...	1	...
<i>Terias hecabe</i> . . .	1	...	2	...	2	
<i>Huphina nerissa</i> . . .	1	...	...	...	...
TOTAL . . .	5	3	2	8	12	

			Wet Season.	Somewhat Wet.	Intermediate.	Somewhat Dry.	Dry Season.	
<i>Precis lemonias</i>	1	Darjiling, Dec. 13-22, 1903. No rain.
<i>Melanitis ismene</i>	.	.	...	...	...	...	1
<i>Mycalesis indistans</i>	.	.	...	...	...	...	8
<i>Catopsilia pyranthe</i>	.	.	...	...	...	1	...
<i>Ixias pyrene</i>	.	.	...	...	1	5	1
<i>Terias hecabe</i>	.	.	...	...	...	1	6
„ <i>lata</i>	.	.	...	...	...	2	...
<i>Huphina nerissa</i>	.	.	1	...	...	...	4
„ <i>nalina</i>	.	.	...	1	...	...	2
<i>Tachyris hippo</i>	.	.	...	...	...	...	1
<i>Prioneris thestylis</i>	1	Bankipur, Jhansi, Agra, Jaipur, Ajmir and Mt. Abu, Dec. 24, 1903-Feb. 8, 1904. Slight rain Jan. 14-23.
<i>Hiposcritia lalage</i>	.	.	...	...	2	1	...
TOTAL	.	.	1	1	3	10	25	
<i>Precis orithyia</i>	.	.	...	...	...	..	3
„ <i>æonoe</i>	.	.	...	...	...	...	1
„ <i>almana</i>	.	.	...	...	...	...	2
„ <i>lemonias</i>	.	.	...	...	...	...	1
<i>Ypthima inica</i>	.	.	...	...	...	2	...
<i>Catopsilia pyranthe</i>	.	.	1	...	...	1	2
<i>Ixias marianne</i>	.	.	...	...	...	2	5
<i>Terias hecabe</i>	.	.	2	1	...	1	2	
„ <i>lata</i>	.	.	...	...	3	6	10
<i>Tetracolus ctrida</i>	.	.	...	1	5	2	3
„ <i>puellaris</i>	.	.	...	...	...	..	1
<i>Huphina nerissa</i>	.	.	...	...	...	...	7
TOTAL	.	.	3	2	8	14	37	

	Wet Season.	Somewhat Wet.	Intermediate.	Somewhat Dry.	Dry Season.	
<i>Precis ænone</i>	1	...	Bijapur, Ananta- pur and Bangalur, Feb. 16-23, 1904. No rain.
„ <i>almana</i> . . .	...	...	...	...	2
<i>Melanitis ismene</i> . . .	...	...	1	...	...
<i>Hypanis ilithyia</i> . . .	...	...	...	4	...
<i>Catopsilia pyranthe</i> . . .	1	...	...	...	3
„ <i>pomona</i> . . .	...	...	...	1	...
<i>Ixias marianne</i> . . .	...	...	...	2	...
<i>Terias hecabe</i> . . .	...	...	...	1	...
„ <i>læta</i> . . .	...	...	1	...	...
<i>Teracolus etrida</i> . . .	...	...	2	2	5
„ <i>dulcis</i>	1	
„ <i>amatus</i> . . .	2	
„ <i>eucharis</i>	1	
TOTAL . . .	3	...	4	11	12	
<i>Precis orithyia</i>	1	...	Nilgiris, Trichin- apali, Tanjur, Madura, Feb. 24- March 7, 1904. Very slight rain in Nilgiris.
„ <i>ænone</i> . . .	...	...	...	...	1
„ <i>almana</i> . . .	...	...	...	1	...
„ <i>lemonias</i> . . .	...	...	...	1	1
<i>Melanitis ismene</i> . . .	...	...	...	...	3
<i>Mycalesis perseus</i> . . .	...	...	...	...	3
<i>Ypthima hübneri</i> . . .	...	...	...	...	1
<i>Hypanis ilithyia</i> . . .	1	1	...	...	...
<i>Catopsilia pyranthe</i> . . .	...	...	2	2	...
„ <i>pomona</i> . . .	...	...	...	1	...
<i>Ixias marianne</i> . . .	...	...	1	...	1
„ <i>pyrene</i> . . .	...	2	...	3	...
<i>Terias hecabe</i> . . .	...	...	2	1	2
<i>Teracolus etrida</i> . . .	1	...	...	...	...
„ <i>eucharis</i> . . .	...	...	...	...	1
„ <i>dandæ</i> . . .	3	5	2	1	...	
<i>Huphina nerissa</i> . . .	...	1	3	1	3
<i>Catophaga paulina</i> . . .	...	1	...	1	4
TOTAL . . .	5	10	10	13	20	

	Wet Season.	Somewhat Wet.	Intermediate.	Somewhat Dry.	Dry Season.	
<i>Precis almana</i> . . .	4	1	Ceylon, March 10-26, 1904. Several showers.
„ <i>atlites</i> . . .	1	2	...	2	2	
<i>Mycalesis mandata</i> . . .	1	...	...	...	...
<i>Catopsilia pyranthe</i> . . .	2	...	...	...	...
„ <i>pomona</i> . . .	...	...	2	2	1
<i>Ixias pyrene</i> . . .	...	...	...	1	...
<i>Terias hecabe</i> . . .	4	2	1	...	1	
„ <i>læta</i> . . .	...	...	...	...	1
<i>Huphina nerissa</i> . . .	1	...	1	...	1	
<i>Catophaga paulina</i> . . .	...	...	2	...	2
TOTAL . . .	13	4	6	5	9	

There was a storm at Simla on October 10th, and a few trifling showers during our expedition to Bághi, but we saw no sign of rain after that, and indeed scarcely a cloud, save at Kurseong, until January 14th, when there was a thunderstorm at Jhánsi. There were then several very slight falls of rain terminating with a long but not heavy rain on January 23rd. There was a very slight fall at Konúr on the night February 29th—March 1st. Then no further rain till Kandy, March 10th. There were several showers in Ceylon.

At Simla the effects of the monsoon were not quite past, and wet-season forms were slightly more numerous than dry; the same applies to Ceylon. At all the other places, as might have been expected, dry-season forms predominated. Calcutta occupies an intermediate position.

It must however be admitted that to prove a species to be dimorphic is not necessarily to prove that the forms are associated with seasons. In the genus *Precis*, so far as my very few observations (limited to the dry season) are worth anything, the two forms ocellated and non-ocellated seem

to be closely associated with wetness and dryness respectively. *Catopsilia pyranthe*, as Dr. Dixey has shown, occupies a far less clear position, and I may add that *Terias hecabe* did not appear to me to follow any rule. The two forms were taken together in most places.

Many dwarfed specimens of the genus *Precis* were met with as the season advanced; with the exception of one *P. almana*, var. *asterie*, they were all of the dry type, most of them markedly so. The smallest *Terias hecabe* was of the dry form, so was a dwarf *Teracolus dulcis*; four dwarfed *T. etrida* were half dry, half intermediate. A dwarf *Belenois mesentina* was dry, but a dwarf *Catopsilia pyranthe* and a dwarf *Huphina nerissa* were intermediate, while a dwarf *Teracolus calais* was actually of the wet-season form.

In conclusion I have to thank the President for much valuable assistance in many ways; I am greatly indebted to Mr. Hamilton H. Druce for most kindly naming all my Lycænids and Hesperids, to Sir George Hampson for much help in naming my moths, to Mr. W. F. Kirby for kindly naming my *Orthoptera* and *Neuroptera*, to Col. C. T. Bingham, Mr. G. E. Austen, and Mr. Claude Morley; to the Rev. F. D. Morice for naming my *Hymenoptera*; to Commander J. J. Walker, R.N., whose practical experience in many lands was of much assistance, and to Mr. W. Holland of the Hope Department for constant help, while to Dr. F. A. Dixey I am indebted not only for the names of all my Pierines and much information about them, but for continual encouragement and inspiration.